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July 14, 1947

STEEL

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The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

EDITORIAL INDEX, PAGE 45

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Pueblo, Colorado
Ingots • Blooms • Billets • Rails and Fastenings • Bars & Structurals • Grader Blades
Grinding Balls • Wire Rods • Wire • Nails • Fences
Bale Ties • Netting • Welded Fabric • Chain Link Fence

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These names and this trade mark identify steel products from coast to coast. Symbols of Quality, Service and Reliability to the consumer.

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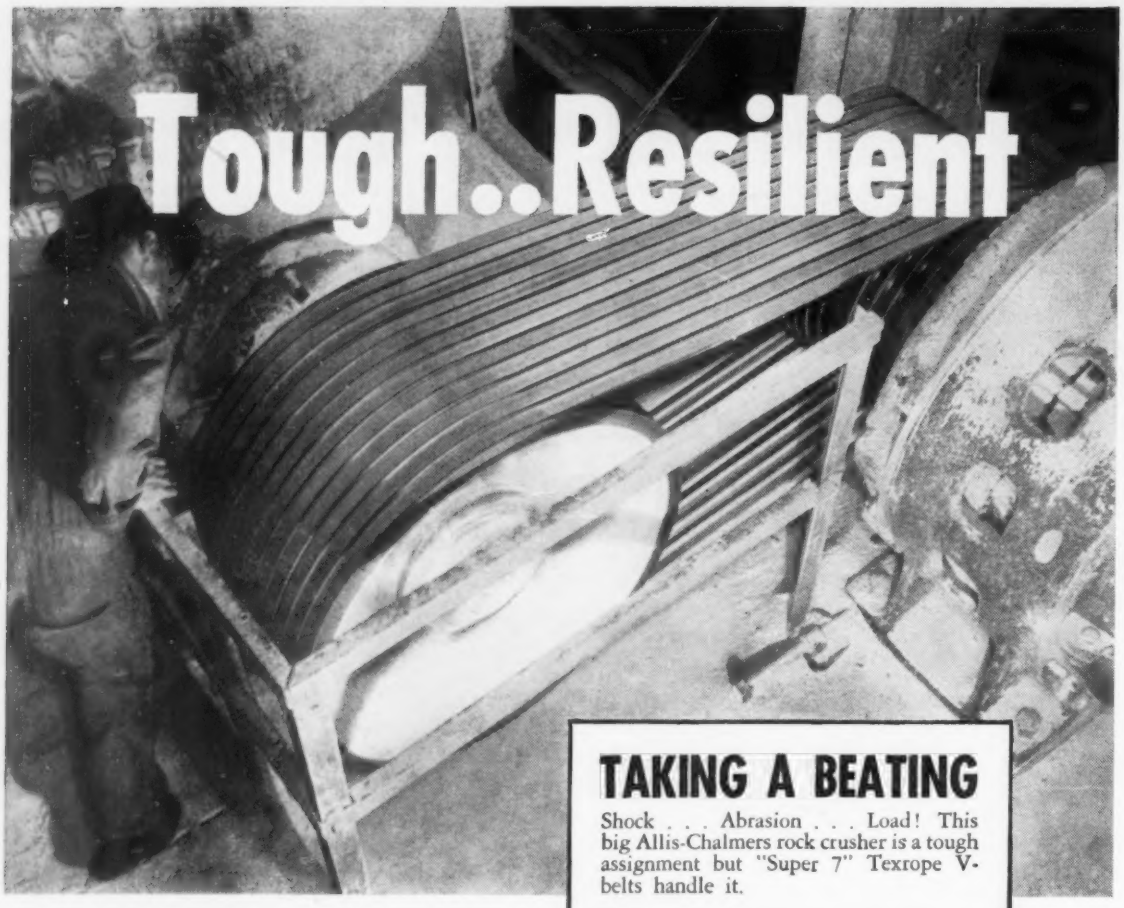
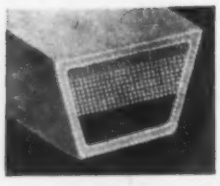


TAKING A BEATING

Shock . . . Abrasion . . . Load! This big Allis-Chalmers rock crusher is a tough assignment but "Super 7" Texrope V-belts handle it.



. . . You get 7 Great Features in "Super 7" Texrope V-Belts

1. TOUGHER COVER. Two layers of tightly woven long-staple cotton fabric and tough, wear-resistant rubber compound. Protects the belt carcass from grit, moisture and wear — holds its shape — assures maximum belt life.

2. SHOCK ABSORBING. "Super 7" belts combine great strength with the degree of resiliency necessary for long life and smooth power transmission.

3. HEAT RESISTING. *All* "Super 7" V-belts are designed and built to give high resistance to heat.

4. STRONGER CORDS. More cords—imbedded in cool-running rubber compound. A powerful load-carrying structure.

5. PRECISION CURED in pressure molds to assure accurate section and perfect bonding of cords, cover and cushion.

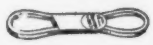
6. ACCURATELY MATCHED. Every belt weighed, measured and carefully inspected before being sized and packed.

7. ENGINEERING LEADERSHIP. "Super 7" Texrope V-belts represent 22 years of research and experience — by Allis-Chalmers, originator of the Multiple V-belt drive.

"Super 7" Texrope V-belts come in five types to meet every operating requirement: *Standard — Heat Resisting — Oil Resisting — Oil Proof* and *Static Resisting*. Call your Allis-Chalmers office or dealer. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN.

A 2238

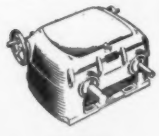
TEXROPE .. Greatest Name in V-Belt Drives



"Super 7" V-BELTS
Five Types — Sizes to suit every power transmission job.

Texsteel, Texdrive, "Magic-Grip"
— sheaves in a full range of sizes, grooves.

"Vari-Pitch" SHEAVES
Exact variations in speed, stationary or motion control.



SPEED CHANGERS
Speed variations up to 375% at the turn of a crank.

ENGINEERING
Finest V-Belt engineering talent in the world—at your call.

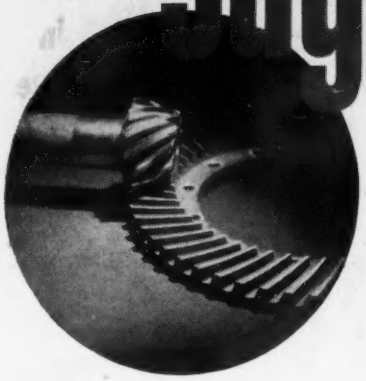
TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

Refer to Sweet's Catalog.

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947
A CENTURY OF SERVICE
to Industry
THAT MADE
America Great



Suggested Structures FOR MACHINABILITY OF ALLOY STEELS

The combination of structure and hardness usually controls alloy-steel machinability.

Among the various alloy steels there are three carbon ranges generally considered: low carbon of .08 to .30 pct; medium carbon of .30 to .50 pct; high carbon of .50 to .80 pct.

In each of these three ranges there are certain structures that may be well suited to one type of machining and at the same time unsuited to another. For example, in a medium carbon range a spheroidized structure may be good for turning operations yet poor for broaching. This means that a compromise must usually be accepted to obtain the most economical overall machining operations on any one steel.

The table below is a suggested guide. It shows various combinations of carbon range, heat-treating process and structure believed to be best suited for each type of machining.

Further information on machinability of alloy steels will be found in the new Third Edition of Bethlehem's publication, "Properties of Frequently Used Carbon and Alloy Steels." This 132-page book is filled with helpful, timely information of interest to users of steel. Your request will bring a copy to you by return mail.

CARBON RANGE	PROCESS	STRUCTURE	TURNING	FORMING	DRILLING	BROACHING
Low (C .08 to .30)	Normalize or Anneal	Blocky Ferrite	Good	Good	Good	Good
Medium (C .30 to .50)	Anneal	Spheroidized	Good	Poor	Fair	Poor
Medium (C .30 to .50)	Anneal	Lamellar	Fair	Good	Good	Good
Medium (C .30 to .50)	Heat Treat	Sorbitic	Fair	Fair	Fair	Fair
High (C .50 to .80)	Anneal	Spheroidized	Good	Good	Good	Fair
High (C .50 to .80)	Anneal	Lamellar	Fair	Poor	Poor	Poor
High (C .50 to .80)	Heat Treat	Sorbitic	Good	Fair	Good	Good

Milling and threading are not shown. For practical purposes these two operations more or less follow the suggestions given for forming and broaching.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

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Sinews of STEEL plus AIR POWER

aid the worker and increase production

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The operating features of Ingersoll-Rand Air Tools make them extremely popular with the foundry men. You get—power regulation—durability—*more power per pound of weight*—trouble-free service and safety. In addition, each tool is backed by Ingersoll-Rand service in all industrial centers.

Our engineers are available to assist you in selecting the proper tool for the job...call them...make use of their experience.

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Koroseal bathtub gives irons an acid scrub

Koroseal is a typical B. F. Goodrich development

THOSE are electric irons going through acid, being plated with nickel and made ready for their last "face-lifting" of chrome for a permanently bright and shiny look. The process used to be a headache—the acid would in time eat any tank that tried to hold it, and leaks, danger to workers, expense, constant repairs were the result.

Then B. F. Goodrich developed *Koroseal* flexible synthetic—as a waterproof material for raincoats, shower curtains, umbrellas. But *Koroseal* was found to be just as resistant to most acids, to grease, oil, paint as to water—and industry discovered almost as many uses for it as did homes. As a lining for the tank in the picture, it holds the hot acid for years.

Koroseal flexible synthetic makes taste-proof, sanitary, easy-to-clean beverage hose. In gaskets for the building industry it resists sunlight and air, remains flexible and water-tight indefinitely. As bus and taxicab upholstery, it lasts many times longer than traditional upholstery, keeps its good looks, and can be cleaned just by a damp cloth. In flooring *Koroseal* outlasts the most expensive materials. In hose it is ⅓ lighter, can be left out in the sun, and seems to have no limit to its life.

Koroseal flexible synthetic is making the most popular raincoats, baby pants, handbags, bowl covers and a score of other household items ever developed. But don't forget that in industry, too, its resistance to acids, abrasion, water and air make possible products and processes at lower cost than were ever possible before. The B. F. Goodrich Company, Akron, Ohio.

Koroseal—Trade Mark, Reg. U. S. Pat. Off.

B.F. Goodrich

Koroseal flexible synthetic

Behind the Scenes...

In Re-Cut Nails

We have further intelligence on cut nails. Seems that the early nailmakers really had something in those cut nails, although wire nails have now taken the giant's share of the nail market, cut nails are still made and used. Principal markets, according to S. A. Meder of Wheeling Steel, are now along the eastern seaboard and in the southern states. They're used principally in laying hardwood flooring, or where hardwood is used for other construction purposes. Some builders have also found that the cut nails are useful for attaching joists and studding directly to concrete blocks. A special hardened cut nail is used for this purpose. The method of manufacture is very similar to the time-honored system used by our forefathers. The nails are cut from strip or plate stock which has been slit to the required width. This width then becomes the length of the nail, with an allowance for forming the head. What with a shortage of nails during the war, there has been an increased demand for these cut nails, and the few manufacturers in the business feel there will be a definite future market for them.

Editorially Speaking

All this talk about the rehabilitation of the war-torn countries and the international quarrels arising therefrom make up a subject far removed from the usual run of things we write about in this space. However, a letter we received from the British Zone in occupied Germany brings it close enough to home to let us do a small bit of editorializing here. Not that we plan to run competition with the boss, who has two pages to himself slightly east of here, but we'd just like to point out in a small way one phase of the rehabilitation problem. In last week's book you saw the picture of a German plant in the Russian zone, with nothing left but a heap of rubble. Germany's technical development is in literally the same condition, metaphorically speaking. The particular letter we're talking about is from one of our former subscribers, who bemoans the fact that he can't collect any American dollars to use for a renewal of his subscription. Even if he could, we couldn't accept them because we can't send copies into Germany under present regulations. And what's more, we (not the editorial we, but we meaning the industries of America) aren't receiving any reports on technical developments over there. Until such a free exchange of technical developments can be once more established, much will be lost on both sides of the sea. Any good steel man can count off the important developments that American industry has adopted from German steel practice, and the same is true in other phases of metalworking. Much of the talent responsible for such developments is still in existence over there, waiting for a chance to go back to work. Within the framework of world security, it seems to us a good idea to start peaceful research and industrial development back into normal channels.

Index Ready Soon

Now being compiled and soon to be on the presses, STEEL's semi-annual index covering the first half of 1947 will be a completely revamped job, including both the regular alphabetic index published since the beginning of STEEL in 1882 and the Topical Index, which we have compiled for the past two years. This latter gadget has been so popular that we decided to incorporate it into the regular index and issue it semi-annually instead of once a year. The new index will also include two other features not previously compiled—a complete list of company names and an author index. All this has been done for you, dear readers, to make more useful the tremendous amount of material provided for you by the editors by making it easier to find in retrospect. We hope you like the idea, and we'll remind you right now that if you want a copy or copies of this finest of indices to the important developments in the metalworking industry, they're free for the asking. Drop us a line and we'll put your name down for copies as soon as they're off the press.

Beyond the Ore

As we're writing these lines, we can look out our window and watch the Hulett unloaders gulping thousands of tons of good red ore out of the hulls of ore boats, watch the car dumpers pouring thousands of tons of good black coal into the emptied ore boats, and realize that we're seeing one of the basic operations of the metalworking industry. What we're really seeing, though, is that sparkling blue expanse of Lake Erie out beyond and the calendar on the wall, which says July 3. Now, for a couple of days, we'll be able to do more than just look at that blue water!

Shrdlu

(Editorial Index—page 43)

STEEL

Vol. 121—No. 2 July 14, 1947

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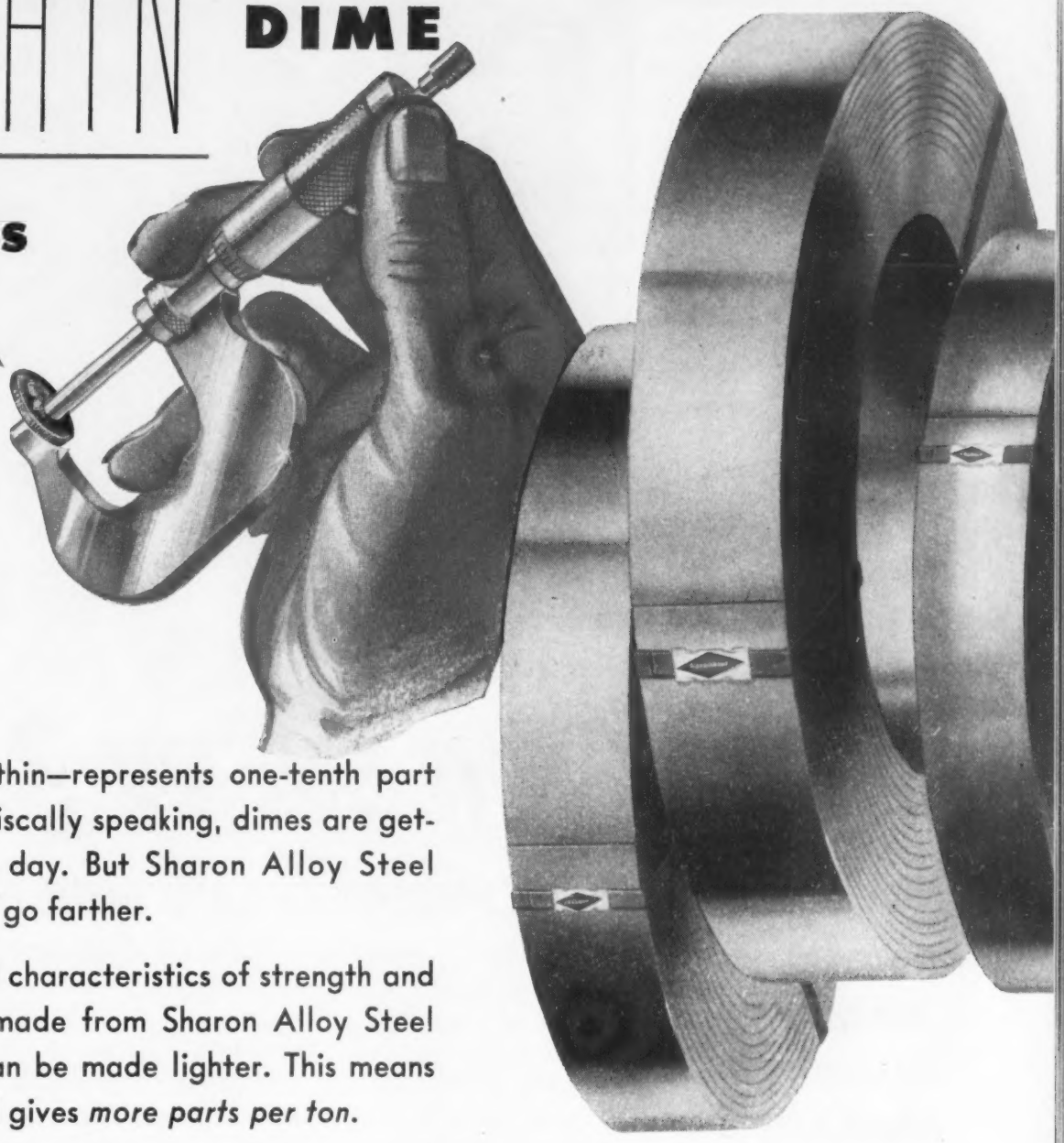
Editorial Staff on Contents Page

ONE THIN DIME



A dime—thick or thin—represents one-tenth part of a dollar. And, fiscally speaking, dimes are getting thinner every day. But Sharon Alloy Steel makes thin dimes go farther.

Because of unusual characteristics of strength and endurance, parts made from Sharon Alloy Steel —part for part—can be made lighter. This means Sharon Alloy Steel gives *more parts per ton.*

From hair springs to hair dryers, from shavers to steamships — in fact, for anything that moves — there is a Sharon Alloy Steel to make your product lighter, stronger, more reliable . . . make it less costly.

If your problem is the choice of an alloy steel or its method of fabrication, consult Sharon's experienced metallurgists *today.* It won't cost you a dime.

SHARONSTEEL

ALLOY STRIP STEEL

SHARON STEEL CORPORATION
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Sharon, Pennsylvania

PRODUCTS OF SHARON STEEL CORPORATION AND SUBSIDIARIES: THE NILES ROLLING MILL COMPANY, NILES, OHIO; DETROIT TUBE AND STEEL COMPANY, DETROIT, MICHIGAN; BRAINARD STEEL DIVISION, WARREN, OHIO. Hot and Cold Rolled Stainless Strip Steel — Alloy Strip Steel — High Carbon Strip Steel — Galvanite Special Coated Products—Cooperage Hoop—Detroit Seamless Steel Tubing—Seamless Steel Tubing in Alloy and Carbon Grades for Mechanical, Pressure and Aircraft Applications—Electrical Steel Sheets — Hot Rolled Annealed and Deoxidized Sheets — Galvanized Sheets — Enameling Grade Steel — Welded Tubing — Galvanized and Fabricated Steel Strip.

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Part is a tread pin, 18 in. long by 1⅜-in. dia. Material is SAE-1045 cold-rolled steel. Requirements are 50-55 Rockwell "C" at surface, ⅛-in. depth of case, without changing core structure.

ONE 18" PIN EVERY 3 MIN.

SURFACE HARDENED TO 52 R "C" by High-Frequency Heating

This tread pin is an example of one advantage of high-frequency heating—obtaining a uniformly hard surface and ductile core without resorting to alloy steel or carburizing.

Pins are progressively surface hardened to 1/8-inch depth at 6 inches per minute while rotated at 30 rpm. Surface is heated to 1550°F and immediately water quenched.

A surface hardness of 52 to 55 Rockwell "C" is obtained, while core remains at approximately 20. Warpage, over the 18 inches, is 1/32 inch or less. No finishing is required because of negligible scale. Working conditions are clean and cool, and since operation is automatic, an unskilled operator can produce excellent and uniform results.

The heating coil was developed by Lepel Laboratories for use with a 30-kw spark-gap converter. Manufacturer developed the motor-driven carriage, mounted on a Lepel quench tank, which provides the progressive feeding and rotation of the pin.

SOLDERING
BRAZING
HARDENING
ANNEALING
MELTING

The same Lepel Spark-gap Converter will handle any or all of these processes, usually with advantages similar to those given in this advertisement. Often this unit will prove substantially more economical than any other high-frequency generator—*particularly when heating non-ferrous or non-magnetic materials.* Changing from one job to another can be done in less than 5 minutes.

If you have any operation — on ferrous or non-ferrous materials — which you think might be handled by high-frequency heating, let us make a quick preliminary investigation. If promising, our engineers can run tests, on samples you supply, and report just what can be done. There is no obligation; inquiries are treated with strictest confidence.

A letter to us will bring you, as you prefer, our latest catalog or a call by a representative. Any description of part or process which you can give may enable us to furnish, immediately, specific helpful data. You can help us by mentioning this advertisement.

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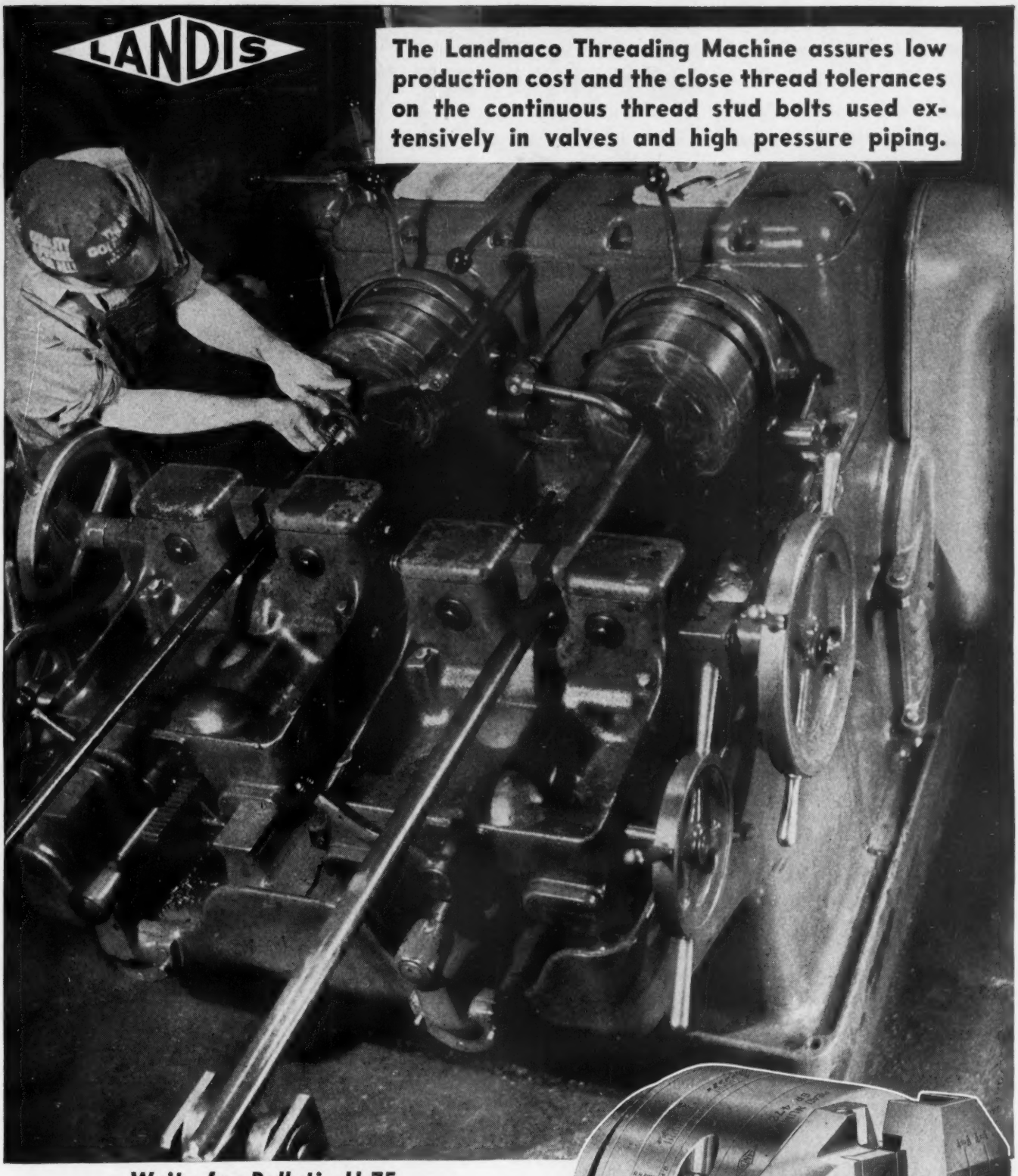
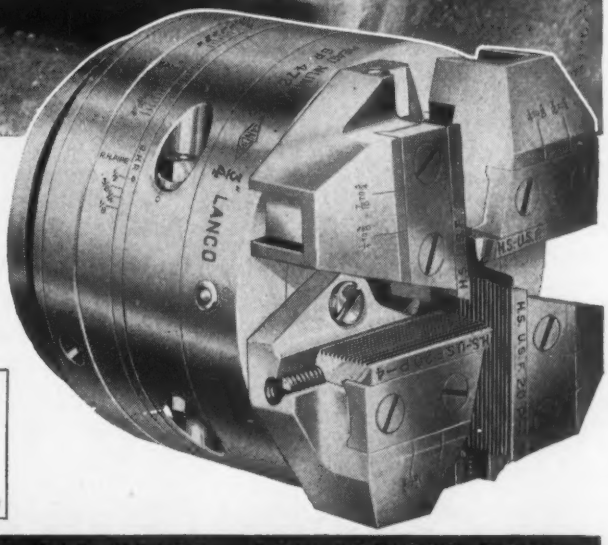
LANDIS

The Landmaco Threading Machine assures low production cost and the close thread tolerances on the continuous thread stud bolts used extensively in valves and high pressure piping.





Write for Bulletin H-75

LANDIS
MACHINE COMPANY
WAYNESBORO, PA., U.S.A.

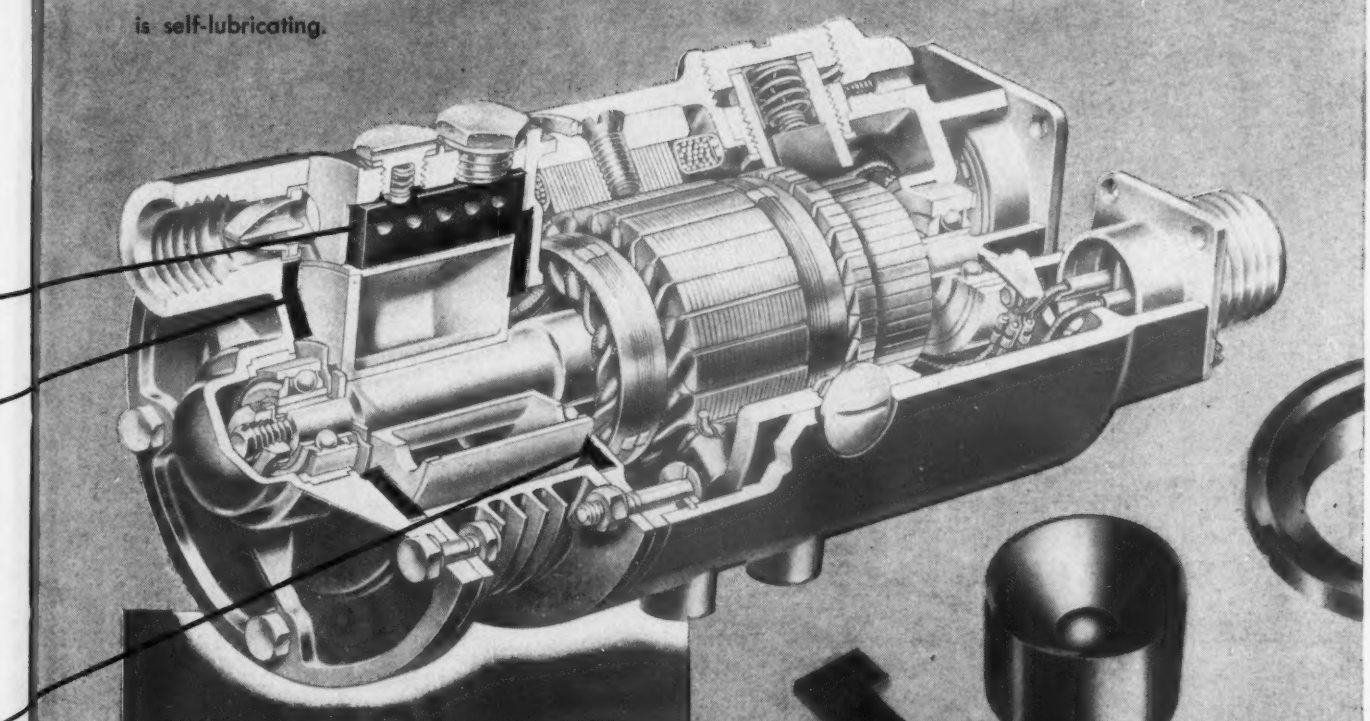
1947 MACHINE TOOL SHOW CHICAGO SEPT 17-26

THREADING MACHINERY—THREAD CUTTING DIE HEADS—COLLAPSIBLE TAPS

graphitar parts maintain
(CARBON-GRAPHITE)
Eclipse-Pioneer Motor Driven Pump Depends
on Graphitar Vanes and End Plates In
Developing Air Pressure For Operating Aircraft
Equipment
THE UNITED STATES GRAPHITE

high efficiency in dry air pump

Small, dependable Graphitar parts perform vital service in the Eclipse-Pioneer Motor Driven Dry Air Pump. This pump, widely used to provide air pressure or suction for aircraft equipment, requires virtually no maintenance and absolutely no lubrication. Motor and pump are integral. The pump rotor operates at speeds up to 12,000 r.p.m. in developing pressures as high as 15 p.s.i. Graphitar vanes are held against the rotor surface by spring pressure, maintaining a sliding seal to continuously separate air inlet and outlet ports. Graphitar end plates provide an efficient air seal between the ends of the rotor and the housing. Engineers of the Eclipse-Pioneer Division of Bendix Aviation Corporation specified Graphitar at these important points, because Graphitar is highly resistant to wear and heat, it is dimensionally stable, and it is self-lubricating.



Graphitar is a carbon-graphite substance that has many unusual properties valuable to efficient mechanical performance. It is self-lubricating, and takes on a high polish under load. It is chemically inert. It will not melt or fuse. It is unaffected by temperature extremes. It is extremely light weight. We are equipped to mold Graphitar parts in a variety of shapes and can finish close-tolerance dimensions—.0005" in small sizes. Send us sketches of your products. Our engineers will show you where Graphitar may improve mechanical performance and save you money. Ask for 44-page catalog.

COMPANY, SAGINAW, MICHIGAN

To Turn Ground Time into Flight Time

THE NEW PARKER UNDERWING FUELING EQUIPMENT

If you fly at a cruising speed of, say 275 mph, you're losing 23 revenue miles every five minutes you're on the ground. You can save those miles—with the new PARKER underwing fueling tank valve and mating hose nozzle.

For example, in actual operation, the new Martin 202 has been gassed up—1,000 gallons—in 8 minutes! By ordinary methods it would take at least 50 minutes.

But time is not all you'll save. Underwing fueling is *safer*—no climbing on icy wings, no open fire hazard. It's *cleaner*—no dirt can blow into the tank, and there's no overflow to spill on the runway. It's *easier on maintenance*—no scraping over de-icer boots and wing surfaces.

PARKER Underwing Fueling Equipment (to specifications approved by the Air Transport Association) is designed to handle up to 200 gallons per minute. Can you save on-the-ground time at that rate? Let us furnish complete details.

OTHER PARKER AIRCRAFT PRODUCTS

- Tube Fittings—AN standard and flareless types.
- Fuel Valves—shut-off, selector, including motor-driven.
- Hydraulic Valves—check, relief, restrictor, shuttle, etc.
- Air and Vacuum Valves, Swing Check Valves.
- Engine Primers, Strainers, Drain Cocks.

Write for Bulletin A41, reviewing PARKER Aircraft Products.

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TUBE FITTINGS • VALVES

Rigid Control *makes* Rugged Rolls

Exacting controls of molding, pouring temperatures, heat treating, machining and grinding are your assurance that Ohio Rolls (Steel or Iron) will give the extra wear your application requires.

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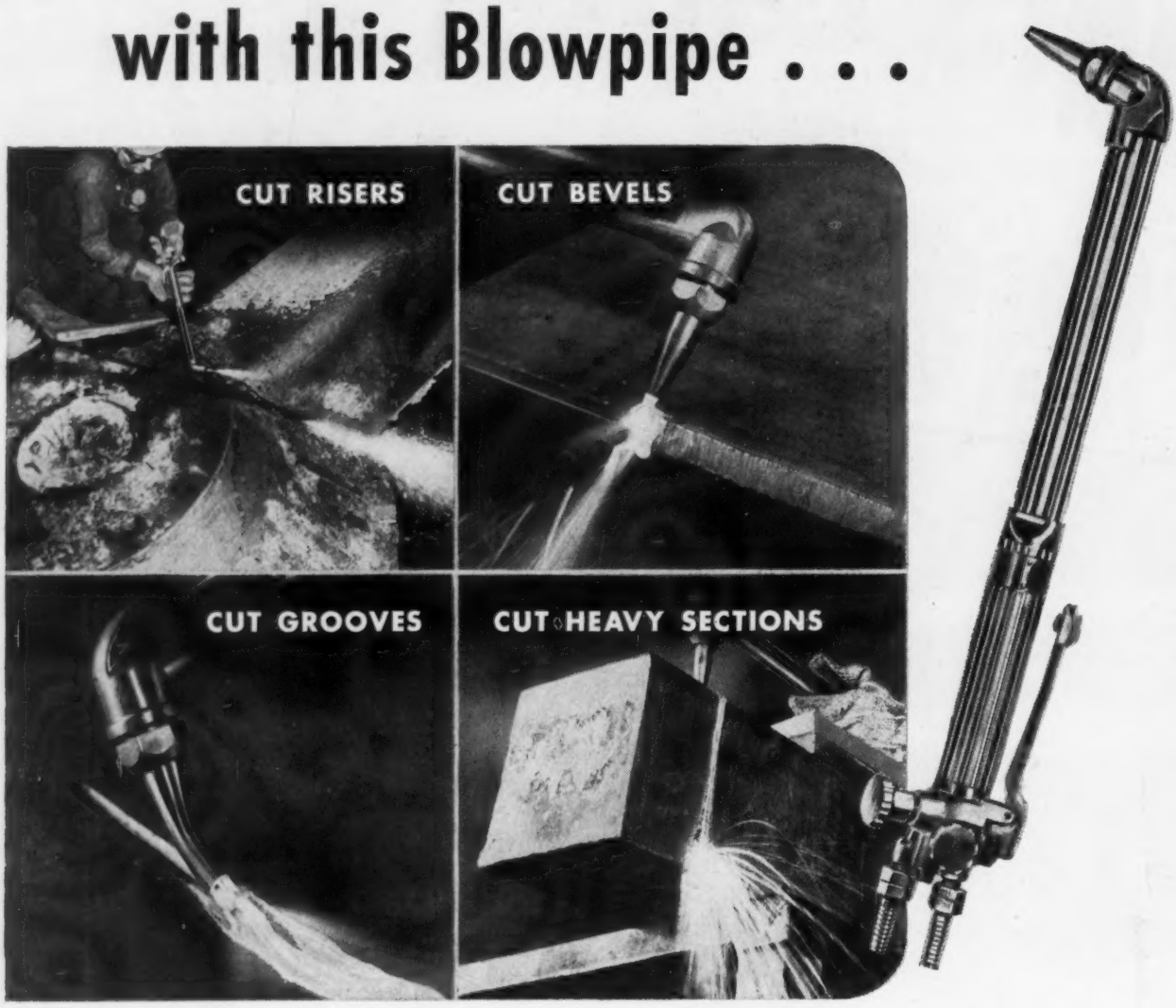
SHAPING METAL FOR ALL INDUSTRY

Select from any of these eleven types of Ohio Steel and Iron Rolls: Carbon Steel Rolls, Ohioloy Rolls, Ohioloy "K" Rolls, HOLL-O-CAST Rolls, Chilled Iron Rolls, Alloy Chilled Iron Rolls, Dense Iron Rolls, Nickel Grain Rolls, Special Iron Rolls, Nioloy Rolls, Flintuff Rolls.

THE OHIO STEEL FOUNDRY COMPANY ★ LIMA, OHIO

Plants at Springfield and Lima, Ohio

Here's what you can do with this Blowpipe . . .



. . . and, by selecting from a choice of 57 different nozzles you can use the OXWELD C-32 to do almost any metal-cutting job practicable with manual equipment.

This sturdy cutting blowpipe is easy to handle and is built to give years of economical service even under the most strenuous conditions of use. A specially designed mixing chamber provides high flashback resistance. The C-32 operates on medium-pressure (5-15 lb. per sq. in.) acetylene.

Write for a catalog or ask Linde to demonstrate the advantages of this blowpipe.

The word "Oxweld" is a registered trade-mark of Union Carbide and Carbon Corporation.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

30 E. 42nd St., New York 17, N. Y. UCC Offices in Other Principal Cities

In Canada: Dominion Oxygen Company, Limited, Toronto

Only....16 SQUARE FEET OF FLOOR SPACE

is required to accommodate the 3-U SPEED-FLEX Automatic Turret Lathe

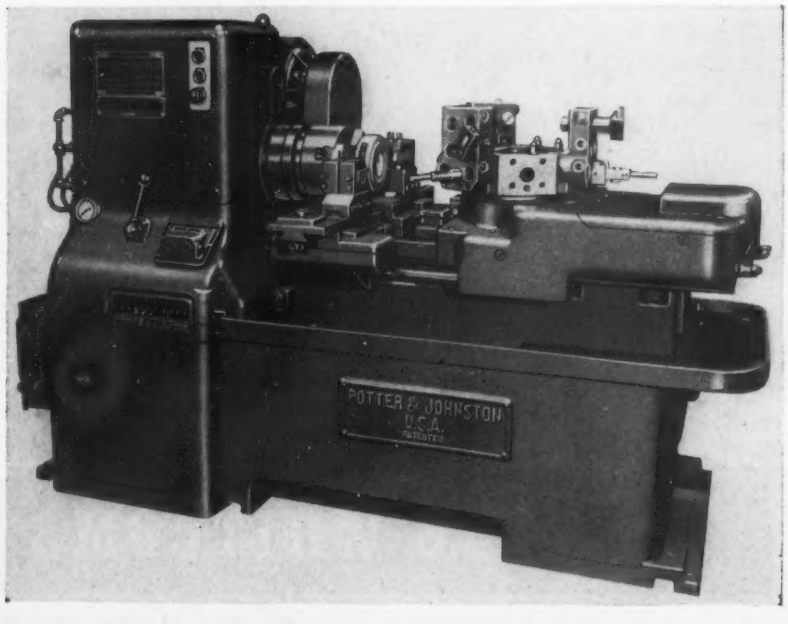
P. & J. Automatics will be Demonstrated in Action
BOOTH 43
MACHINE TOOL SHOW
Chicago — Sept. 17-26

GENERAL DIMENSIONS

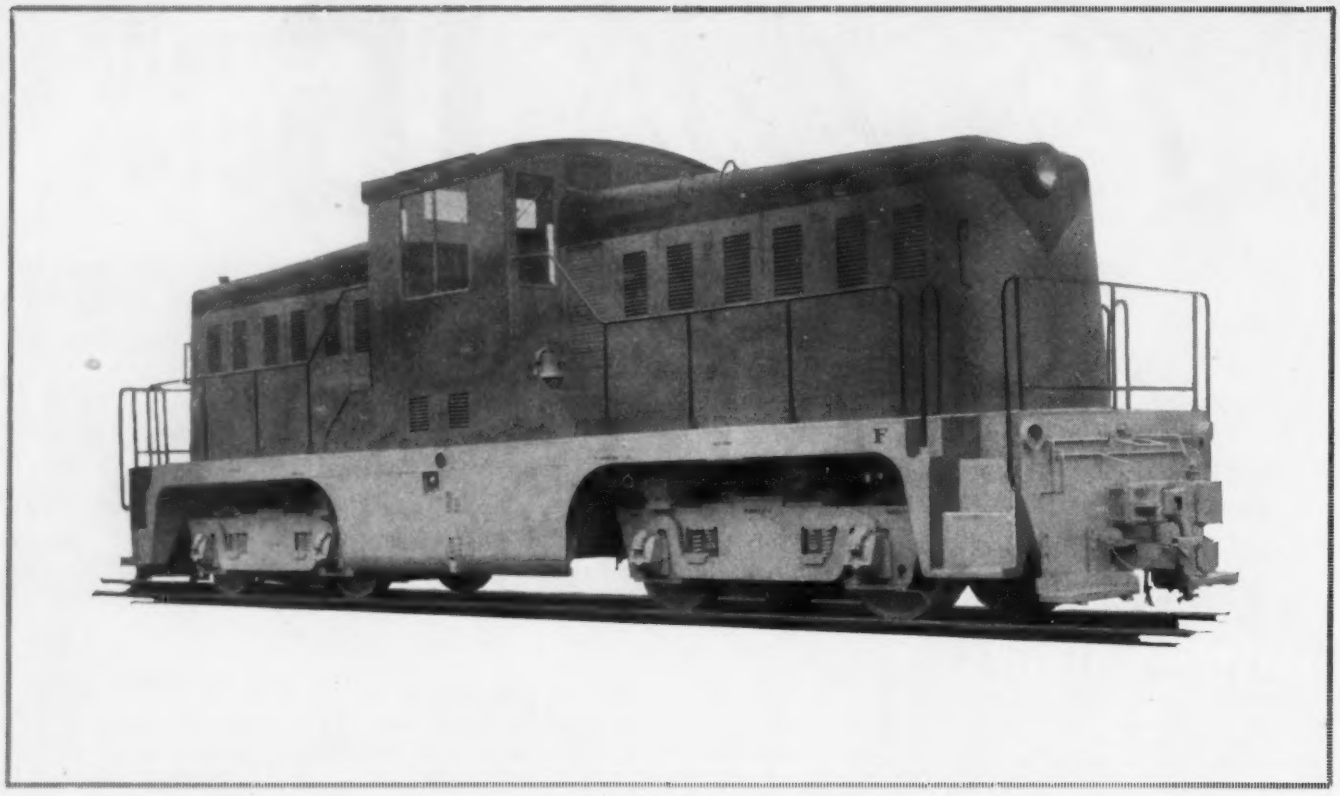
Swing over cross slide	8¾" Dia.
Travel of cross slide-each way	2½"
Number of turret faces	6
Diameter of hole in turret	1½"
Depth of holes in turret	Through
Distance from center of turret hole to top of turret slide	2⅞"
Total turret slide travel	6"
Turret Feed	4½"
Spindle Adjustment	3"
Cross slide adjustment	None
Diameter of hole through spindle	1½"
Horsepower required to drive	5
Net Weight	5,000
Gross weight, boxed for sea shipment	5,600
Dimensions of Case	7' 11" x 3' 9" x 4' 3"
Cubic Contents	126 cu. ft.

P. & J.'s latest development, the 3-U AUTOMATIC TURRET LATHE, is a big potential in a small package. Fully set up, and ready to utilize its power and high speed demanded by carbide tooling, it occupies a mere 16 square feet of floor area. This is really an insignificant space requirement for a machine that:

(1) is rugged and powerful; (2) reduces cost per piece by reason of its speed and efficiency; (3) is equipped with electro-pneumatic speed control; (4) is provided with six turret faces provided for the mounting of tools; (5) that weighs 5600 lbs., boxed for shipment. The 3U has 48 changes of speed arranged in six sets of four automatic changes. Multiple disc clutches are used for the speed changes. Other advantages are: simultaneous multiple operation; electrical equipment and motor located for maximum convenience for servicing; ease in cleaning—and, to repeat, MINIMUM FLOOR SPACE IN RELATION TO CAPACITY OF MACHINE. When you consider automatics for your production line, we respectfully suggest that you investigate our claims for the P. & J. 3-U SPEED-FLEX AUTOMATIC TURRET LATHE.



POTTER & JOHNSTON
MACHINE COMPANY
Pawtucket, Rhode Island



WITH 40 YEARS EXPERIENCE BEHIND THEM WHITCOMB LOCOMOTIVES OUGHT TO BE GOOD

No, it didn't take forty years to build the Whitcomb locomotive illustrated above, but there are that many years of rich experience built into this and every other locomotive that leaves the Whitcomb plant.

That's just one reason why you can specify Whitcomb locomotives with confidence. You can also be sure that your new Whitcomb will perform exactly as the Whitcomb engineers promised. You can be sure that your operating and maintenance costs will be economically low. You can be sure your Whitcomb will be available for service near 100% of every 24 hours. And finally you can be positive, that for its weight, there is no finer locomotive on the rails. For in addition to the "know how" built into every Whitcomb, you'll find the component parts made outside the Whitcomb plant, supplied by carefully selected vendors who are leaders in their respective fields.

DIESEL LOCOMOTIVES: ELECTRIC DRIVE 25 TO 95 TONS
MECHANICAL OR HYDRAULIC DRIVE 3 TO 30 TONS

BLW THE BALDWIN GROUP

THE WHITCOMB LOCOMOTIVE CO.

ROCHELLE, ILL.

Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

for Every User of Worm Gears

This new 48-page, data-filled catalog gives all the information necessary for the selection of correct worm and gear sets for any given requirement. It includes information concerning selection practice, worm gear rating tables, instructions for computing bearing loads, standard worm and gear dimensions and other information necessary to those requiring high grade worm gear sets for use in their own equipment. A copy of this important catalog will be mailed to you on request.

WG-4

WORM GEAR DIVISION

DE LAVAL
STEAM TURBINE COMPANY
TRENTON 2, N. J.

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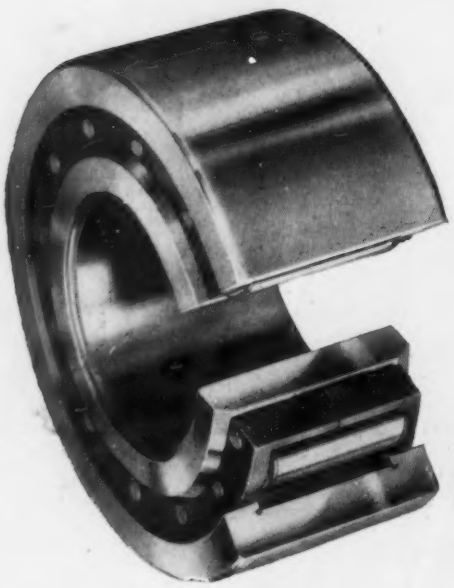
TURBINES · HELICAL GEARS · WORM GEAR SPEED REDUCERS · CENTRIFUGAL PUMPS · CENTRIFUGAL BLOWERS AND COMPRESSORS · IMO OIL PUMPS

REDUCE SHUT-DOWNS *with* ROLLWAY Right-Angle Loading



Cut Maintenance Costs
Get Longer Bearing Life

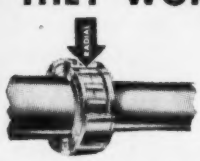
Right-Angle Loading splits compound loads into the two component parts of pure radial and pure thrust . . . and carries each of these components on separate bearing assemblies.

ROLLWAY
RIGHT-ANGLE-LOADED
BEARINGS

WHAT THEY DO

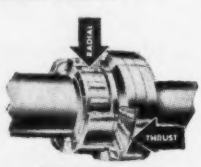
Prevent wedging of rollers and pinch-out ● Reduce roller end-rub, with its wearing friction ● Hold starting and operating torque at a minimum ● Eliminate complicated stresses ● Since only pure radial or pure thrust loads can be imposed on any single bearing assembly, unit pressures are substantially reduced ● Since all loads are carried at right angles to the roller surface, compound or oblique loads are avoided, and so are the resultants of the oblique loads ● Right-angle loading permits Rollway Bearings to carry greater radial or thrust load capacity in any given dimension ● Right-angle loading assures solid cylindrical rollers of greater roller mass and uniform roller cross-section . . . greater resistance to shock loads and vibration . . . longer life expectancy under continuous heavy-duty service.

HOW THEY WORK



When it's pure radial load, the load bears at a right angle to the rollers.

When the load is pure thrust, it bears at a right angle to the rollers.



When radial and thrust are combined, the two loads are resolved separately at a right angle to the rollers.

FREE SERVICE! Get the RIGHT Bearings for Your Particular Needs. Rollway Engineers will gladly make necessary calculations, drawings and supply other required information for a complete understanding of your bearing needs. Strictly confidential. No charge, of course.

ROLLWAY BEARINGS

ROLLWAY BEARING COMPANY, INC., SYRACUSE, N. Y.

SALES OFFICES: Philadelphia • Boston • Pittsburgh • Cleveland • Detroit • Chicago • Minneapolis • Houston • Los Angeles

In your quest for production efficiency, you can count on Weirton strip to serve you as a willing partner, ever ready to ease manufacturing difficulties and to effect economies. Because of its uniformity in composition and thickness, and its exceptional drawing and forming qualities, Weirton strip can be depended on to speed production and to reduce spoilage and scrap losses.

WEIRTON STEEL CO.

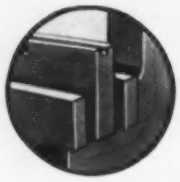
WEIRTON, W. VA. *Sales Offices in Principal Cities*

Division of **NATIONAL STEEL CORPORATION** *Executive Offices, Pittsburgh, Pa.*

Imagine! 8 Series *and* 36 DIFFERENT SIZES OF.. Dual

all Steel PRESS BRAKES with Capacities ranging from 5 ft. of 16 gauge to 20 ft. of ½ inch steel plate!

The amazing 2-way Dual Bolster makes them ideal for many jobs!



There's a Dual All Steel Press Brake for any plant... large or small! The versatile 2-way bolster makes it possible for them to do bending, forming, blanking and multiple punching. Dual doubles the efficiency of your plant... speeds up production!

Consult our Capable Staff of Engineers on your Production Problems!

Write Today! For Illustrated Booklet!

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IT'S HERE

Airco's new... improved line

stainless steel electrodes

for welding chromium-nickel

and chromium steels

All these NEW Airco Stainless Steel electrodes are furnished with a heavy extruded lime type coating for D.C. application. In addition, all but the straight chrome analyses are obtainable with a lime-titania type coating which is usable on A.C. or D.C. The slag produced by either of these coatings is easily removed.

Electrodes with the lime-titania (A.C.-D.C.) coating offer many desirable features not found in the lime coated electrodes. Why? Because when used on A.C., arc blow is eliminated, which, in turn, results in easier manipulation, more uniform arc action, and better appearance of deposit. This class of electrodes can be recommended for all applications on which the lime type of electrode is used, with the possible exception of highly restrained joints on heavy sections or on steels of high hardenability.

For full details about sizes, chemical analyses, and A.I.S.I. Nos. of these performance-proved stainless steel electrodes, fill in the coupon, and mail it today for a free copy of Catalog No. 120A. Air Reduction, General Offices, 60 East 42nd St., New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, General Offices, Houston 1, Texas. Represented Internationally by Airco Export Corporation.

Airco Electrodes for stainless steel welding

AIRCO No.	A.I.S.I. No.	SIZES	Lime Type Coating (D.C.)	Lime-Titania Type Coating (A.C.-D.C.)
19-9	308	1/16 to 1/4"	Yes	Yes
19-9Cb	347	1/16 to 1/4"	"	"
18-8Mo	316	1/16 to 1/4"	"	"
25-12	309	1/16 to 3/16"	"	"
25-12Cb	309Cb	1/16 to 1/4"	"	"
25-20	310	1/16 to 3/16"	"	"
25-20Cb	310Cb	3/32 to 3/16"	"	"
25-20Mo	310Mo	3/32 to 3/16"	"	"
18-8Mo-Cb	316Cb	3/32 to 3/16"	"	"
18-83.5Mo	317	1/16 to 1/4"	"	"
35Ni-15Cr	330	3/32 to 3/16"	"	"
4-6Cr .5Mo	502	3/32 to 3/16"	"	No
9Cr .50Mo	....	3/32 to 3/16"	"	"
12Cr	410	3/32 to 3/16"	"	"
16Cr	430	3/32 to 3/16"	"	"
28Cr	446	1/8 to 3/16"	"	"

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Headquarters for oxygen, acetylene and other gases . . . carbide . . . gas welding and cutting apparatus and supplies . . . arc welders, electrodes and accessories

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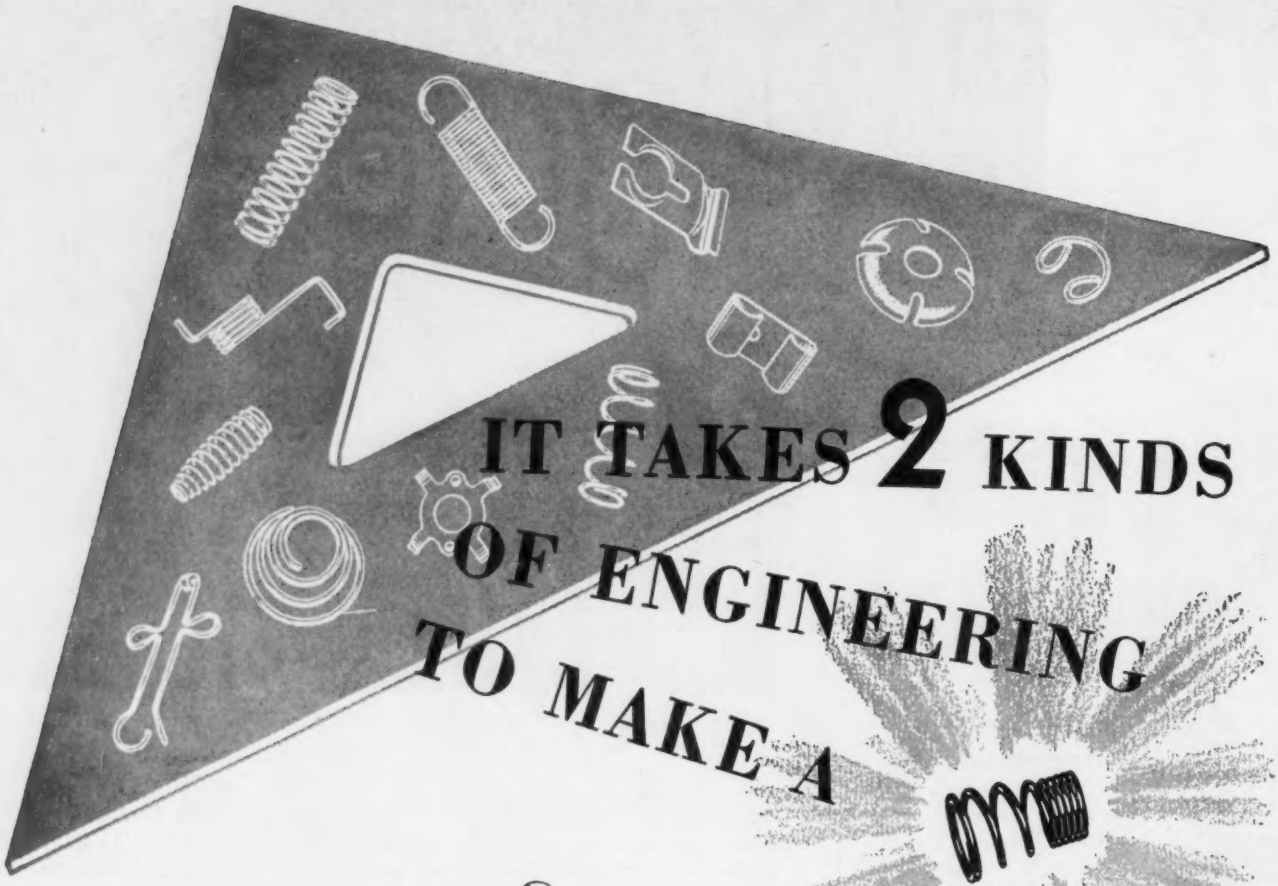
III



IT TAKES 2 KINDS OF ENGINEERING TO MAKE A

Yours

Ours

When your spring specifications call for extra close limits, accuracy at different load tests, tricky bends or end treatment—it's no simple matter to meet them—without costly second operations—*unless* . . . . .

. . . . *someone gives those specifications a good going over for production problems.* Here at Wallace Barnes are men who know how to utilize machinery, materials and methods to get the results you want, in the fewest operations. This knowledge, applied *in the early stages of your design,* may also simplify your problems—or help to avoid costly and unnecessary motions. It's worth a try; next time you plan a spring, let us help, too!

Wallace Barnes SPRINGS

SMALL STAMPINGS • WIRE FORMS • HAIRSPRINGS • COLD ROLLED SPRING STEEL

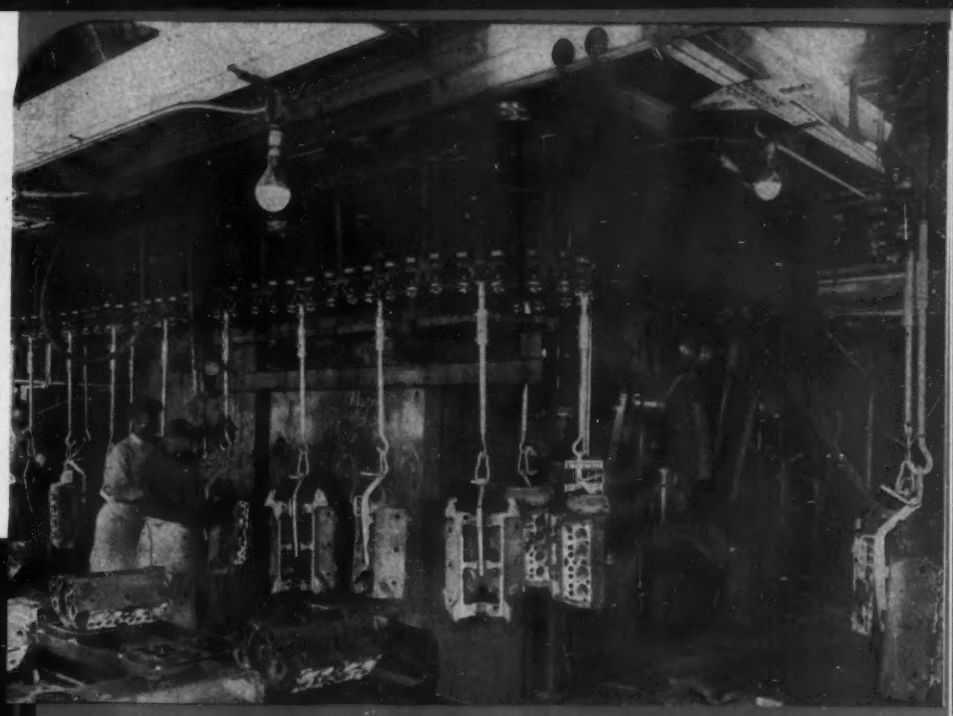
WALLACE BARNES COMPANY
BRISTOL, CONN.

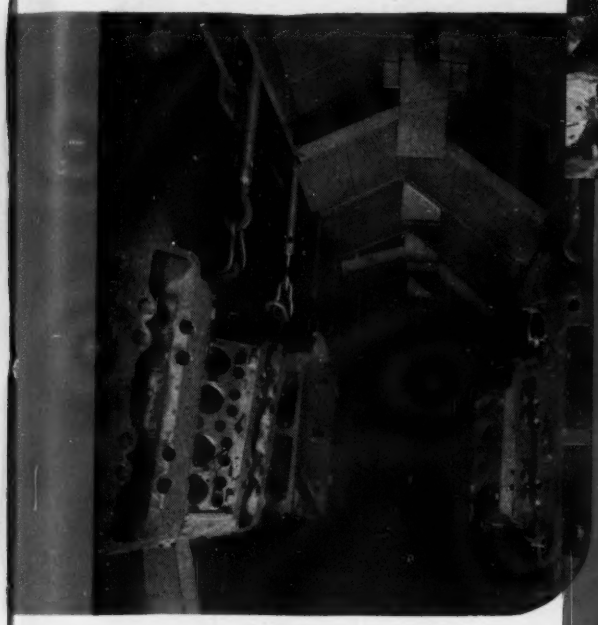
DIVISION OF THE ASSOCIATED SPRING CORP.

AND IN CANADA, THE WALLACE BARNES CO., LTD., HAMILTON, ONTARIO

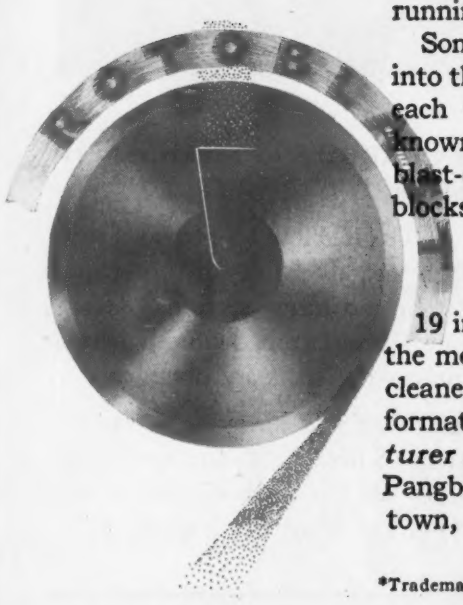
WORK RUNS TO CLEANING STATION...WALKS THROUGH BLAST STREAM

The Pangborn-designed Two-Speed Conveyor brings the work up to the cleaning station *fast* . . . and moves it *slowly* through the blast stream . . . then *hurries* it to the next station. Since the work advances and turns at the same time, all sides of the recesses are completely exposed to the blast stream for effective, uniform cleaning. One pass through cleans the casting.





"BOY SCOUT PACE" HELPS FAMOUS AUTO-MAKER TO Speed Blast Cleaning 44%



You remember the Boy Scout pace — so many steps running, so many steps walking.

Something like that — a Two-Speed Conveyor — built into three new special Pangborn ROTOBLAST* Cabinets, each with five ROTOBLAST units, is helping a well-known automotive manufacturer to increase the rate of blast-cleaning cylinder blocks by 44% — a total of 720 blocks per hour — with a corresponding decrease in costs.

19 AUTO PLANTS USE ROTOBLAST

19 installations (totalling 76 ROTOBLAST units) help the motor makers to save time, increase output, produce cleaner metal, facilitate inspection and finishing. For information write Pangborn, *world's largest manufacturer of blast cleaning and dust control equipment.* Pangborn Corporation, 1298 Pangborn Boulevard, Hagerstown, Maryland.

*Trademark of the Pangborn Corporation.

Pangborn

PANGBORN CORPORATION, HAGERSTOWN, MARYLAND

BLAST CLEANS CHEAPER WITH THE RIGHT EQUIPMENT FOR EVERY JOB

FERROCARBO S

Deoxidation Retains Ductility in Steel

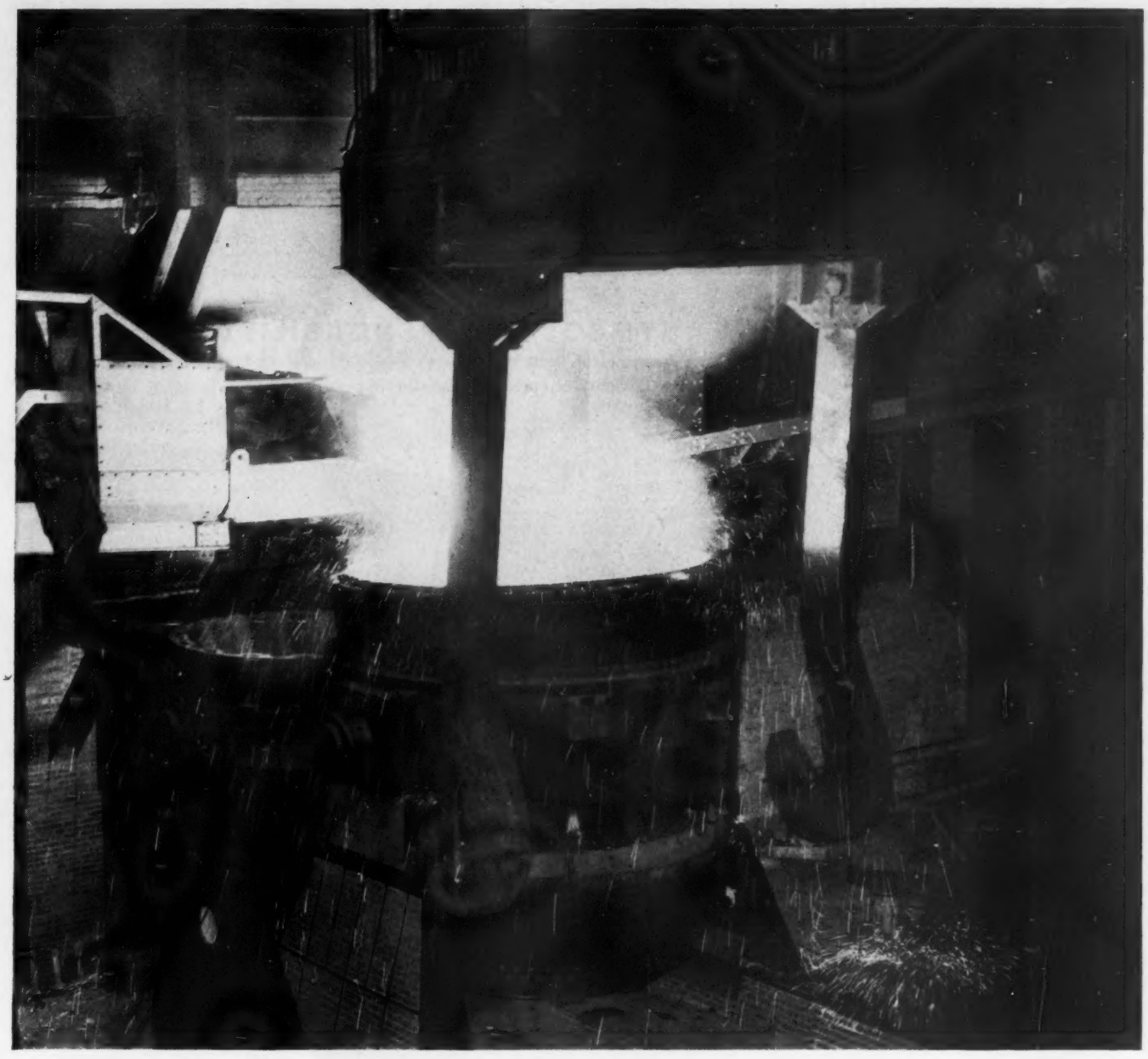
Better quality steel and increased yields result from effective deoxidation secured with FERROCARBO-S. Ductility in the steel is retained. Ingots free from chain-type sulphide inclusions are produced.

Physical properties of mechanically worked steels, both longitudinal and transverse, are decidedly improved. Numerous tests on different kinds of heats with FERROCARBO-S have proven that the addition of FERROCARBO-S increases ductility in the transverse direction. This increase is obtained in any sized ingot. It is especially manifest in large ingots where the ability of FERROCARBO-S to reduce segregation is even more evident.

Added to the ladle, FERROCARBO-S provides steel of improved strength and ductility—insures their uniformity in both light and heavy sections. Reducing segregation, ingot sub-surface is definitely better. Overall savings in processing costs are obtained.

Our metallurgists will be glad to provide additional data on FERROCARBO-S for use in your operations. Write now to Dept. J-77, The Carborundum Company, Refractories Division, Perth Amboy, N. J.

FERROCARBO-S is an efficient and economical ladle deoxidizing agent used in making higher quality open hearth and electric furnace steel.



Add FERROCARBO-S to Molten Steel and get

- Better deoxidation.
- Prolonged increase in fluidity.
- Reduction in the number of inclusions.
- Improved quality and increased ingot yield in fine-grained steel.
- Increased strength plus improved ductility.
- Increased hardenability and creep strength.

FERROCARBO-S

BY CARBORUNDUM

TRADE MARK

FERROCARBO Distributors: Kerchner, Marshall & Co., Pittsburgh, Cleveland and Birmingham; Miller and Company, Chicago, St. Louis and Cincinnati

"Carborundum" and "Ferrocarbo" are registered trademarks which indicate manufacture by The Carborundum Company

For Basic Open-Hearth and Electric Steel Furnaces

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A SYMBOL OF DEPENDABILITY
to operators of basic open-hearth and electric steel furnaces. It's found on operating floors throughout the industry.

A Washington Magnesite Ramming Mixture

Absolute uniformity of H-W Magnamix is the result of painstaking care in production. Constant laboratory checking insures its desirable chemical and physical properties. The early success of H-W Magnamix for bottom maintenance, both hot and cold jobs, was without parallel. Experience over the years has increased the enthusiasm for this 80% magnesia ramming mixture. Today, H-W Magnamix is firmly established as a dependable ramming material for new bottoms, for the maintenance of existing bottoms, for making up front walls and for repiping tap holes.

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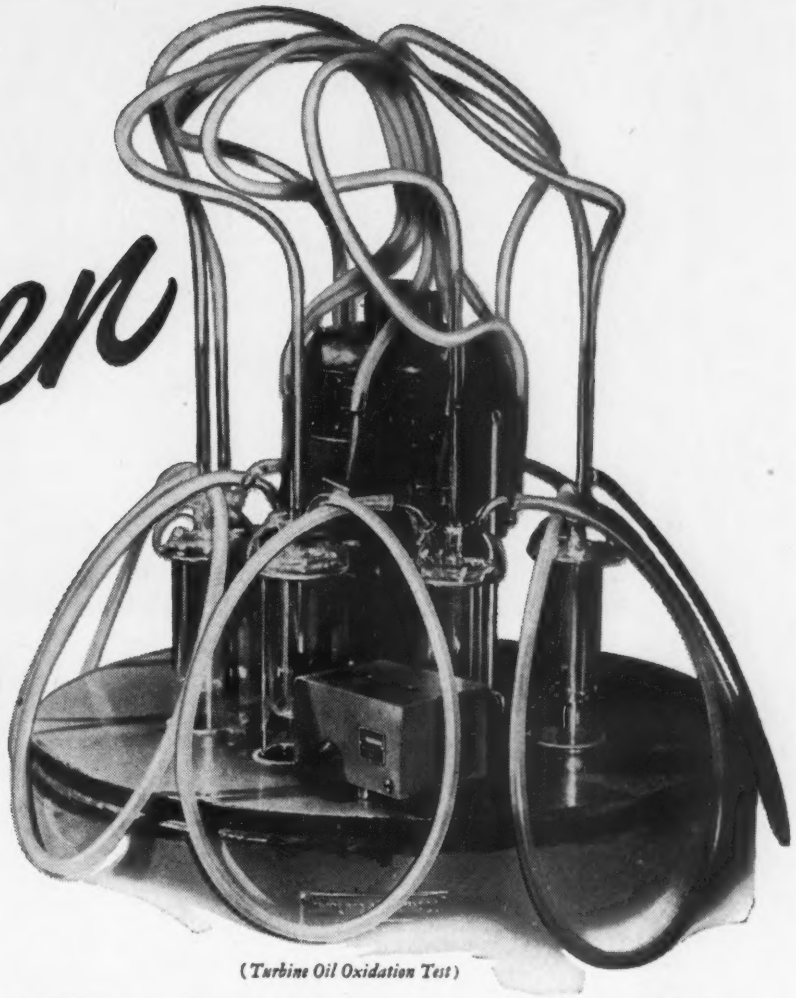
WORLD'S LARGEST PRODUCER OF REFRACTORIES
GENERAL OFFICES, PITTSBURGH 22, PENNSYLVANIA

Oxygen

...FRIEND OR FOE?



(Turbine Oil Oxidation Test)

Without oxygen, man cannot live. Yet, reaction to oxygen may shorten the service life and destroy the value of a lubricant!

Sinclair is ever alert to the importance of knowing exactly how oils will resist oxidation which can form gums and sludge detrimental to equipment performance.

No satisfactory, quick, short time oxidation test methods have yet been developed. Sinclair Research does not compromise. Some studies require continuous tests of 1000 hours. Others, performed with the apparatus above, are run for 100 hours or more.

This test — to assure consumers that breakdown and resultant costly repairs due to oxidation will be at a minimum — constitutes one safeguard against inferior product performance . . . just as all Sinclair Research is your assurance that every Sinclair Industrial Lubricant is the very highest in quality.

Sinclair
Metal Working Oils

SUPER-WILKUT

an all-around cutting oil

For any metal — any automatic

Non staining • non corrosive
even on non-ferrous metals

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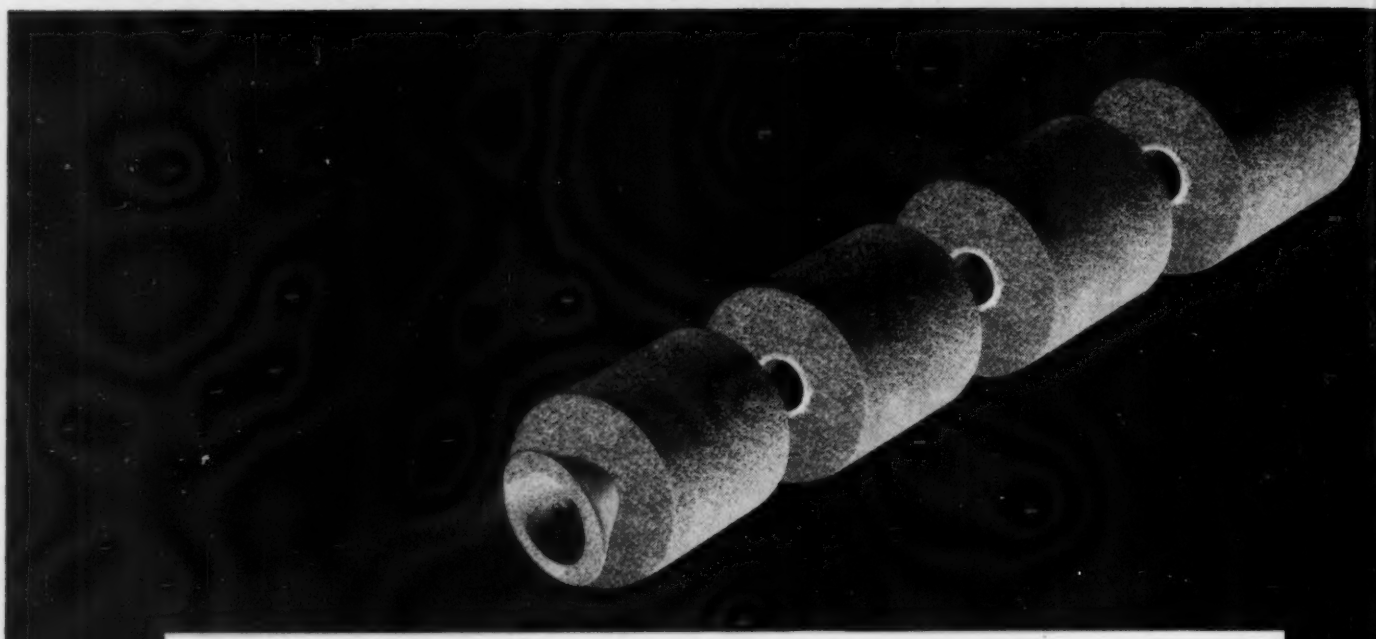
Lubricants for Industry

FINEST CRUDES + EXPERT RESEARCH and MANUFACTURING CONTROL = OUTSTANDING PERFORMANCE



Here's new light on lower grinding costs

Old-fashioned methods of figuring grinding costs can easily keep you in the dark.

Worse yet, they give false information that wastes dollars every day.

If you want to see the light on your grinding costs, here's a simple way that has already saved a lot of money for men in your own industry.

We're talking about the Peninsular method of calculating true expenses by careful analysis of all factors that influence grinding costs.

Peninsular engineers, who do the job, have specialized in grinding problems since 1889. And in almost every case they've worked on, *they have been able to cut production expenses appreciably.*

The Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit 7, Michigan. *Sales Offices:* Chicago, Philadelphia, Boston, Buffalo, Cleveland, Pittsburgh, Houston, St. Louis, Cincinnati.

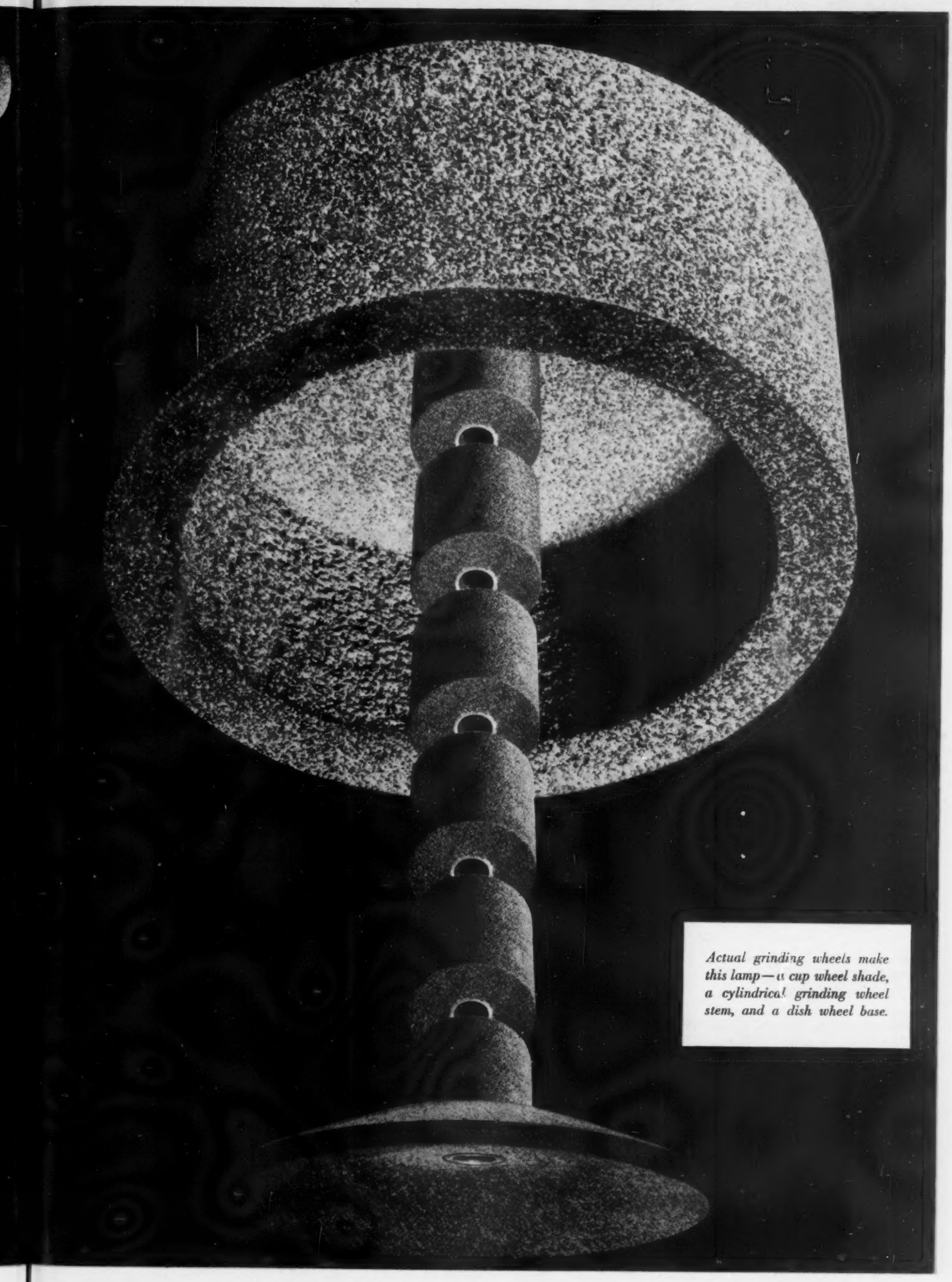
PENINSULAR

INDIVIDUALLY PENINSULAR *ENGINEERED*

GRINDING WHEELS

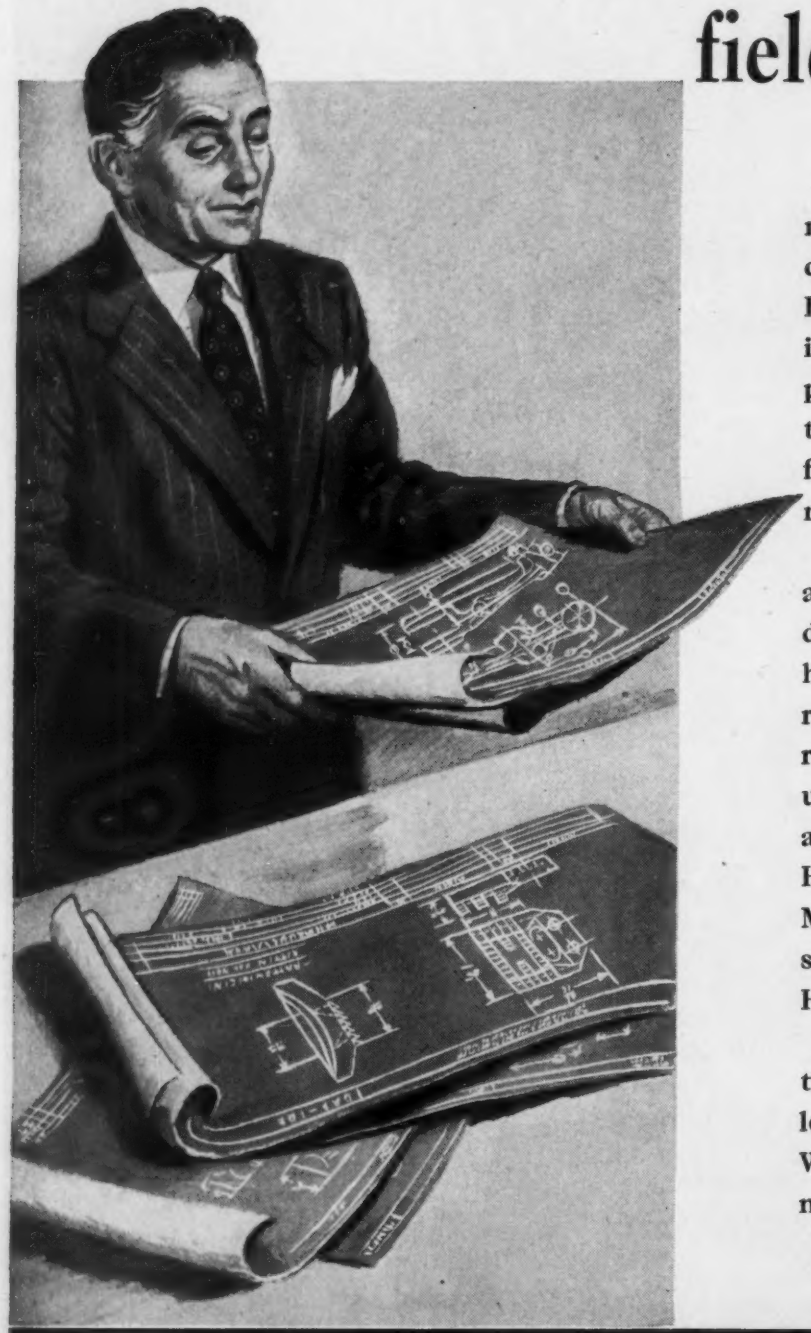
SINCE 1889

SPECIALISTS IN RESINOID BONDED WHEELS



Actual grinding wheels make this lamp—a cup wheel shade, a cylindrical grinding wheel stem, and a dish wheel base.

Have FABRICATING PROBLEMS limited your field of design?



Your parts can be engineered for material and performance rather than convenience of fabrication if you specify HAYNES precision castings. Parts of intricate design can be produced in production quantities by this process to close dimensional standards so that finishing operations are reduced to a minimum.

HAYNES precision castings are available in a wide range of alloys that dominate the field where strength and hardness at high temperatures, and resistance to abrasion or corrosion are required. Among the alloys having this unique combination of properties and available as precision castings are HAYNES STELLITE, HASTELLOY, and MULTIMET alloys. Various stainless steels also are precision-cast by the HAYNES method.

Our engineers will be glad to discuss the possibility of producing your problem parts by HAYNES precision casting. Write to any office for further information.

The registered trade-marks "Haynes," "Haynes Stellite," "Hastelloy," and "Multimet" distinguish products of Haynes Stellite Company.

HAYNES TRADE-MARK *alloys*

Haynes Stellite Company

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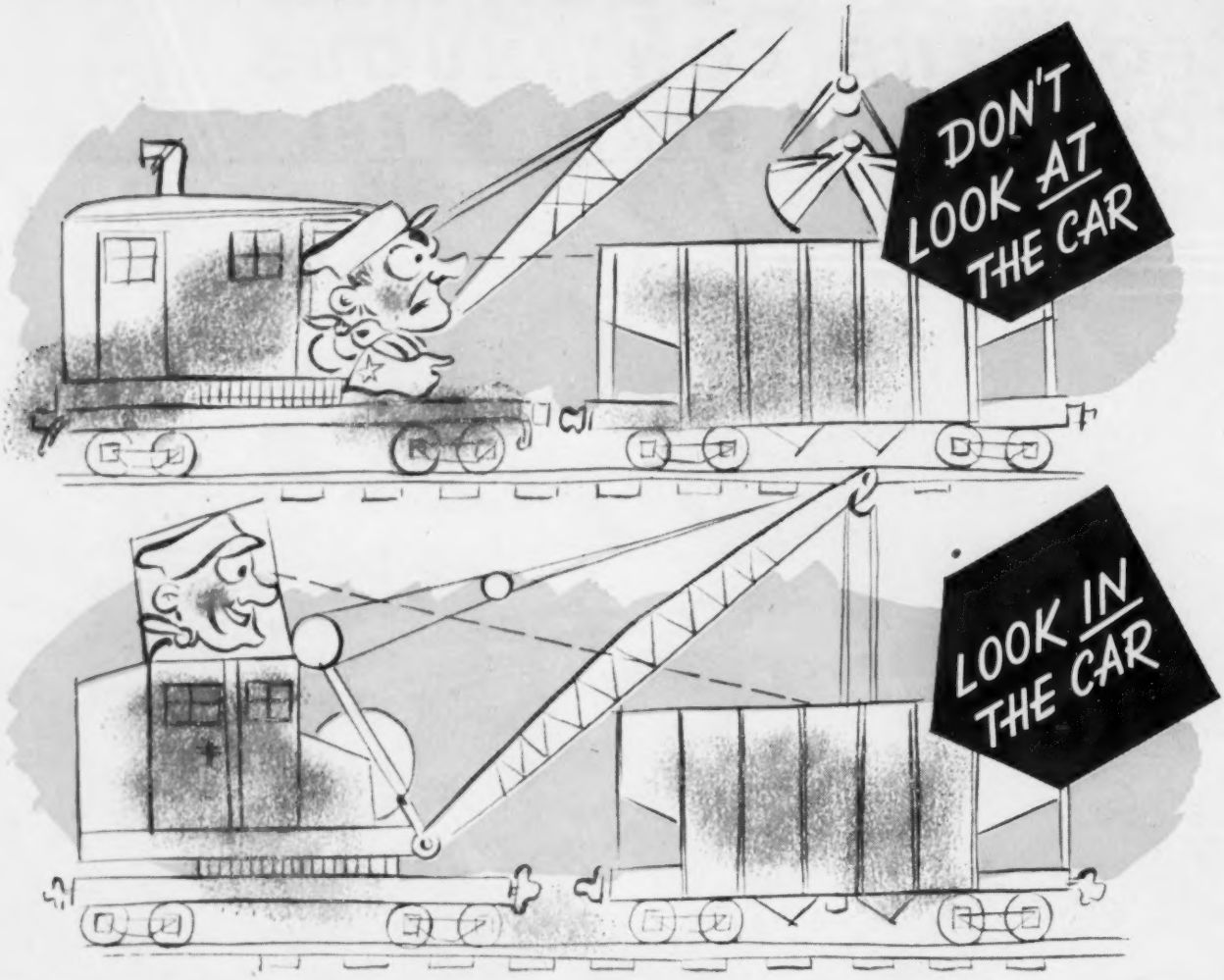
WEAN EQUIPMENT FOR THE CONTINUOUS COATING OF STRIP STEEL

THE Wean Engineering Company is meeting today's demand for equipment to produce tin plate and zinc coated strip steel with light coatings by the electrolytic method; also equipment to produce chemically treated black plate and strip steel. Equipment for coating strip steel with zinc and other materials by the hot dip method is also available.

The WEAN ENGINEERING COMPANY, Inc.
Warren, Ohio
Subsidiary Company
THE BRODEN CONSTRUCTION CO.
CLEVELAND, OHIO

SPECIALISTS IN SHEET, TIN AND STRIP MILL EQUIPMENT



You *SEE* what you're doing from the monitor-type cab of the BROWNHOIST DIESEL LOCOMOTIVE CRANE

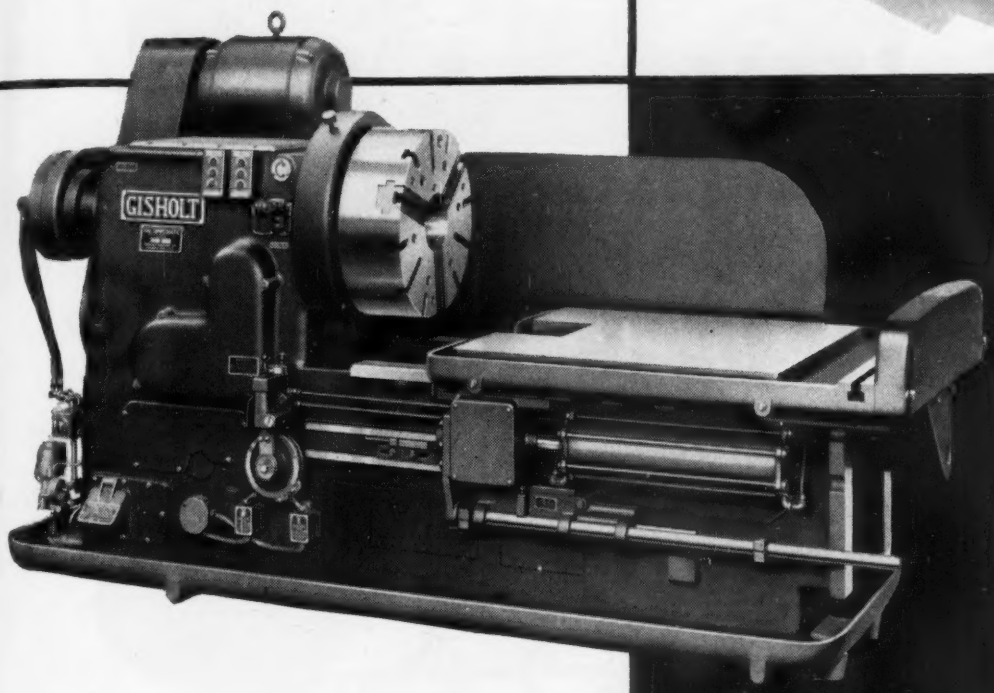
When you load material in or out of a railroad gondola car with a Brownhoist Diesel Locomotive Crane, you look right *into the car*—not simply at it. You *know* what you're doing—you don't guess. That's because you're in the patented Monitor-Type cab that stations the crane operator well above the hoisting mechanism—assures a commanding overall view in front, to the rear, and on both sides. Brownhoist 360° visibility means greater materials handling *efficiency, speed, and safety,* because it eliminates hazardous guesswork, awkward maneuvering, and peering around corners. Add to this great advantage the many superior Brownhoist engineering features—finger-tip controls, rotating and travel friction disc clutches with 1-point adjustment, anti-friction bearings, 14″ safety clearance between car body and rotating bed, one-piece cast steel bed, and many others—and you get the *absolute tops* in efficient, economical crane performance with hook, magnet, or bucket. Write for complete particulars

Brownhoist builds better cranes

INDUSTRIAL BROWNHOIST CORPORATION • BAY CITY, MICHIGAN

DISTRICT OFFICES: NEW YORK, PHILADELPHIA, CLEVELAND, CHICAGO • AGENCIES: DETROIT, BIRMINGHAM, HOUSTON, DENVER, LOS ANGELES, SAN FRANCISCO, SEATTLE, VANCOUVER, B. C., WINNIPEG, CANADIAN BROWNHOIST LTD., MONTREAL, QUEBEC.

before you build a Special Machine . . .



investigate the SIMPLIMATIC

PERHAPS you won't have to invest in special equipment after all. For the surprising range of machining problems which the Gisholt Simplimatic solves may include some of your problems, too.

Simple in its basic design, the Simplimatic is a machine which may be individualized for high production on many jobs—with full utilization of the base machine.

The answer to your problem may be found in the wide variety of slide positions possible on the large platen table. Or perhaps through the addition of a tailstock for between-centers work. With a linkage arrangement between slides it will handle spherical boring in conjunction with facing and turning. A vertical head, instead of the horizontal platen, may serve your need. Or you can even set it up for simultaneous double end machining.

Users everywhere are taking advantage of the Simplimatic's varied possibilities to get production on many common and "special" machining jobs. If you have large volume work, where automatic machining can cut costs, investigate the highly adaptable Simplimatic before you have special machines built.

GISHOLT MACHINE COMPANY
Madison 3, Wisconsin

THE GISHOLT ROUND TABLE
represents the collective experience of leading specialists in the machining, surface finishing and balancing of round and semi-round parts. Your problems are welcomed here.

TURRET LATHES · AUTOMATIC LATHES · BALANCERS · SUPERFINISHERS · SPECIAL MACHINES

Two Fine *Metal Cutting Saws* for Production and General Utility

WELLS No. 8

with wet cutting system

Here's a saw that will pay dividends on practically any cut-off job. It's fast, versatile and economical. The wet cutting system illustrated is a low cost extra that makes possible higher cutting speeds and longer blade life.

Specifications

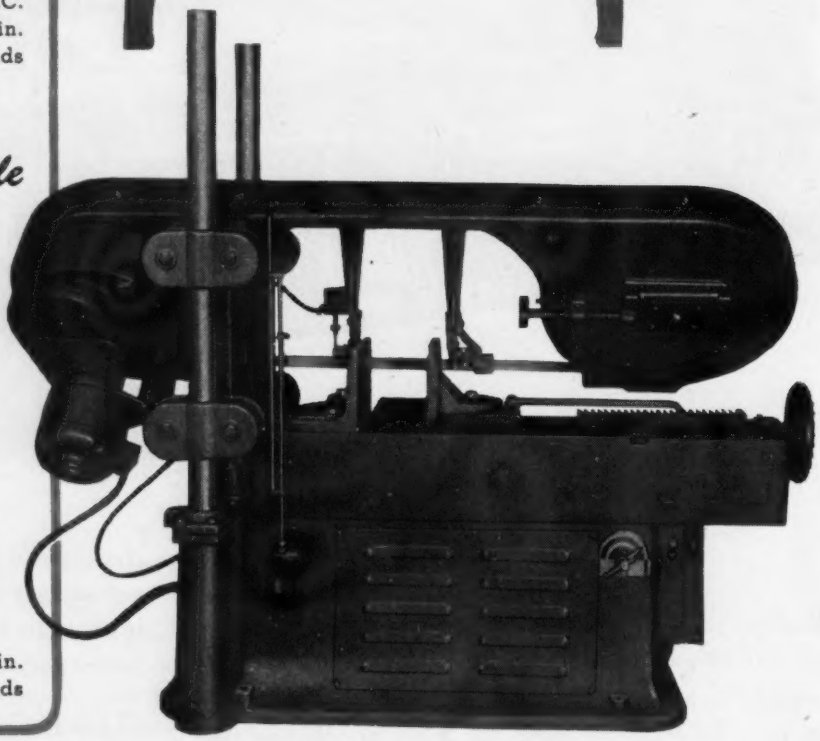
CAPACITY:
- Rectangular . . . . 8" x 16"
- Special Guides . . 5" x 24"
- Rounds . . . . . 8" O. D.

MOTOR . . . . . ½ H.P., A.C., or D.C.
SPEEDS . Selective; 60, 90, 130 ft. per min.
WEIGHT . . . Approximately 665 pounds

WELLS No. 12

with automatic cutting cycle

The new Wells No. 12 is an electrically powered, hydraulically controlled saw. Just push a button and the head comes down and makes the cut at a controlled blade pressure. At the completion of the cut the head returns to a predetermined position and the motors shut off.



Specifications

CAPACITY:
- Rectangular . . . . . 12" x 16"
- Rounds . . . . . 12¾" O.D.

MOTORS . . . ¾ H.P. and ⅓ H.P.
SPEEDS . Selective; 50, 90, 150 ft. per min.
WEIGHT . . Approximately 1750 pounds

Wells SAWS
THE SIGN OF SERVICE

Wells

Products by Wells are Practical

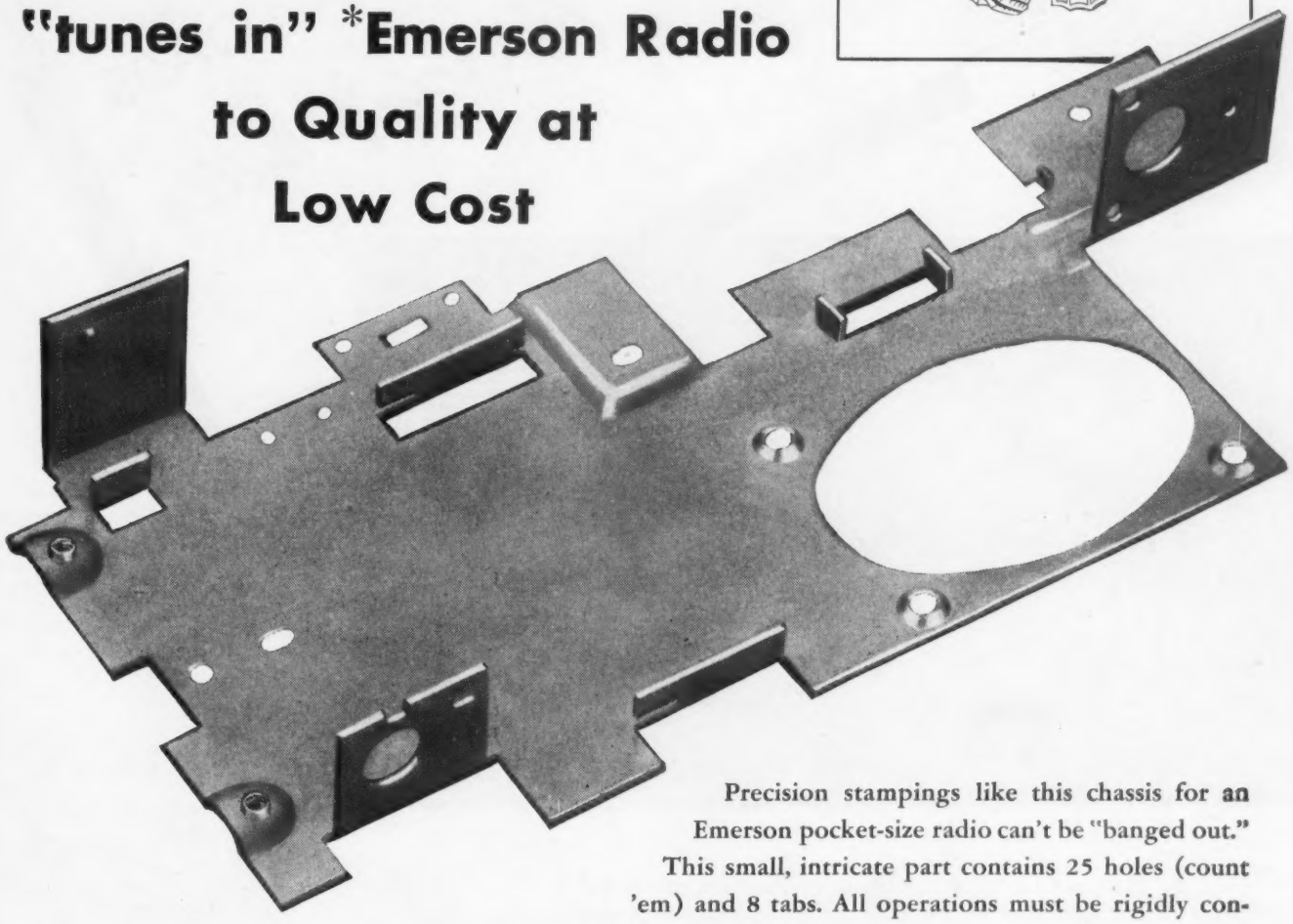
METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
1515 FILLMORE ST., THREE RIVERS, MICHIGAN

Presteel

STAMPING SKILL

"tunes in" *Emerson Radio to Quality at Low Cost



Precision stampings like this chassis for an Emerson pocket-size radio can't be "banged out." This small, intricate part contains 25 holes (count 'em) and 8 tabs. All operations must be rigidly controlled to provide exact hole locations and to hold the positions of the formed tabs to extremely close tolerances.

The chassis is blanked, formed, notched, slotted, lanced, pierced and tapped. The small size of the finished product requires extremely accurate stamping — yet high production speeds are obtained, quality upheld and costs are lowered. It is furnished to the customer complete, ready for plating and assembly.

Solving stamping problems of this kind is all in the *day's work* to Presteel—but much *night work* may go into their solution. Chances are, we can help you solve yours.

*Emerson Radio and Phonograph Corporation, New York

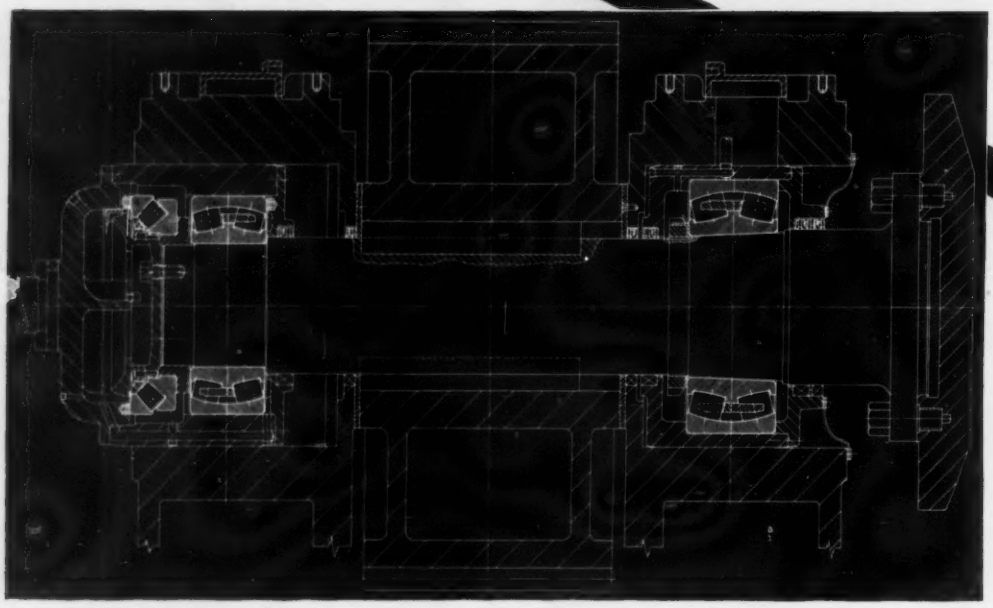
WORCESTER PRESSED STEEL CO.

ALLOY STEELS AND OTHER METALS COLD FASHIONED SINCE 1883

507 BARBER AVENUE, WORCESTER 6, MASS.

Representatives in Alexandria Virginia, Buffalo, Canton Ohio, Chicago, Denver, Detroit, Fort Worth, Indianapolis, Los Angeles, New York, Philadelphia, Syracuse, Toronto

FOR THE HEAVY THRUST LOADS *developed on Piercing mills*



Designed for all severe duty applications at normal or sustained high speeds, SKF Spherical Roller Bearings, with their inherent alignment, give maximum capacity for the heavy loads developed in piercing mill operation. Mounted as shown above on the disc shaft of a 24" mill, spherical roller thrust bearings are equally adaptable for thrust blocks and other steel mill equipment, such as screwdowns and large worm gear speed reducer units, big high-speed pumps, etc. Another good example of SKF putting the right bearing in the right place. 6287

SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.

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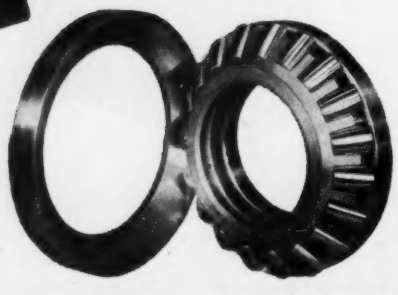
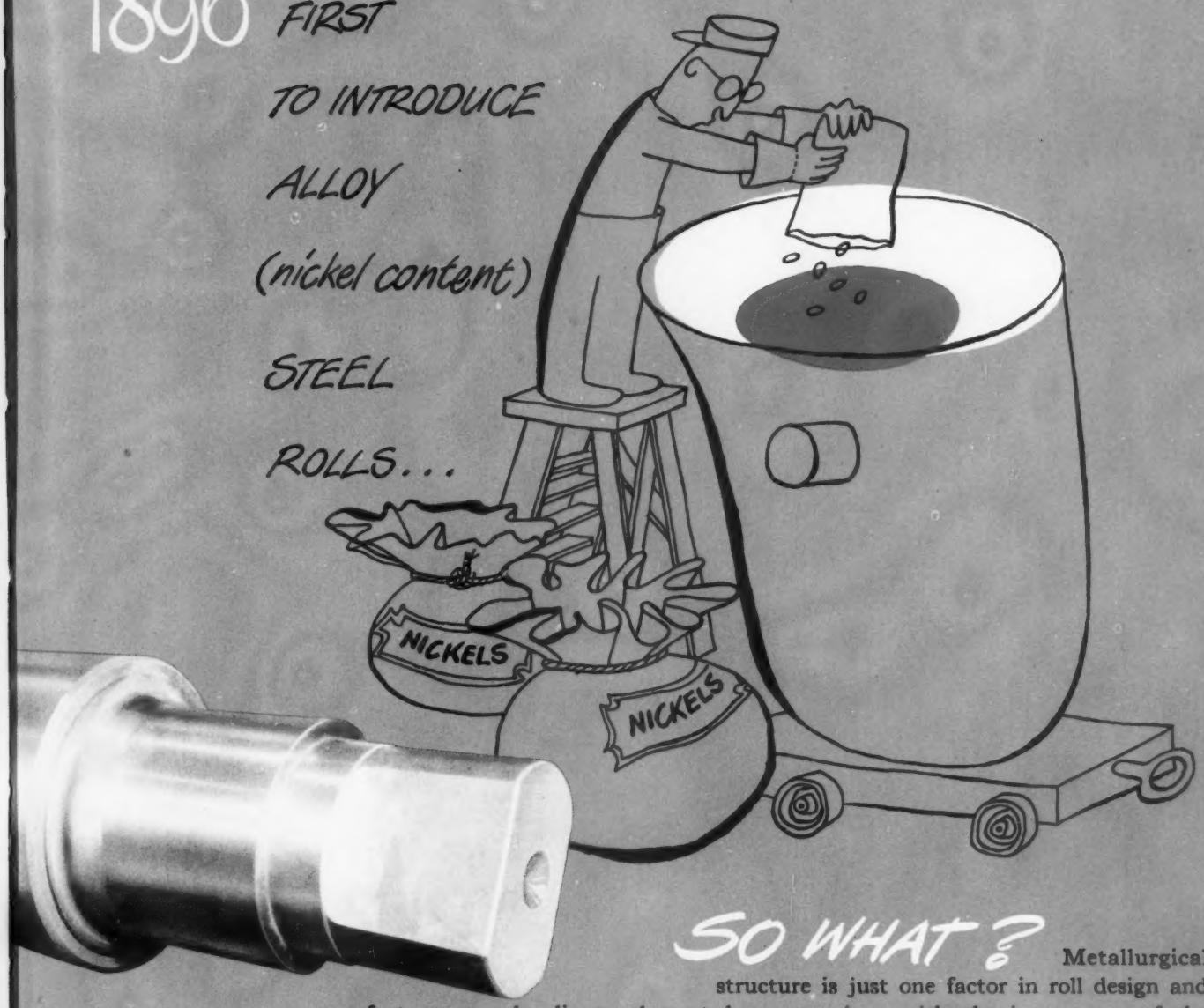
SPHERICAL ROLLER THRUST BEARINGS



1896 FIRST TO INTRODUCE ALLOY (nickel content) STEEL ROLLS...



SO WHAT?

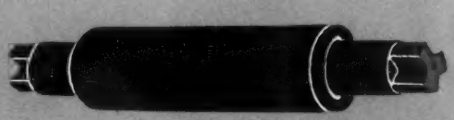
Metallurgical structure is just one factor in roll design and manufacture—a subordinate element by comparison with the importance of the rolling-mill operator.

In more than a century of association with metal-rolling we've learned that the skill of the operator in *the proper use of the proper rolls* is the really important factor—we've learned that Mackintosh-Hemphill engineers and metallurgists face a constant challenge to continue the pioneering effort which resulted in Mack-Hemp's introduction of virtually every major roll development.

So that you, as an operator, may achieve the highest standards of excellence in metal-rolling Mackintosh-Hemphill engineers are continuing their study of everyday mill problems, accepting the challenge to develop rolls which will accomplish the most difficult production tasks.

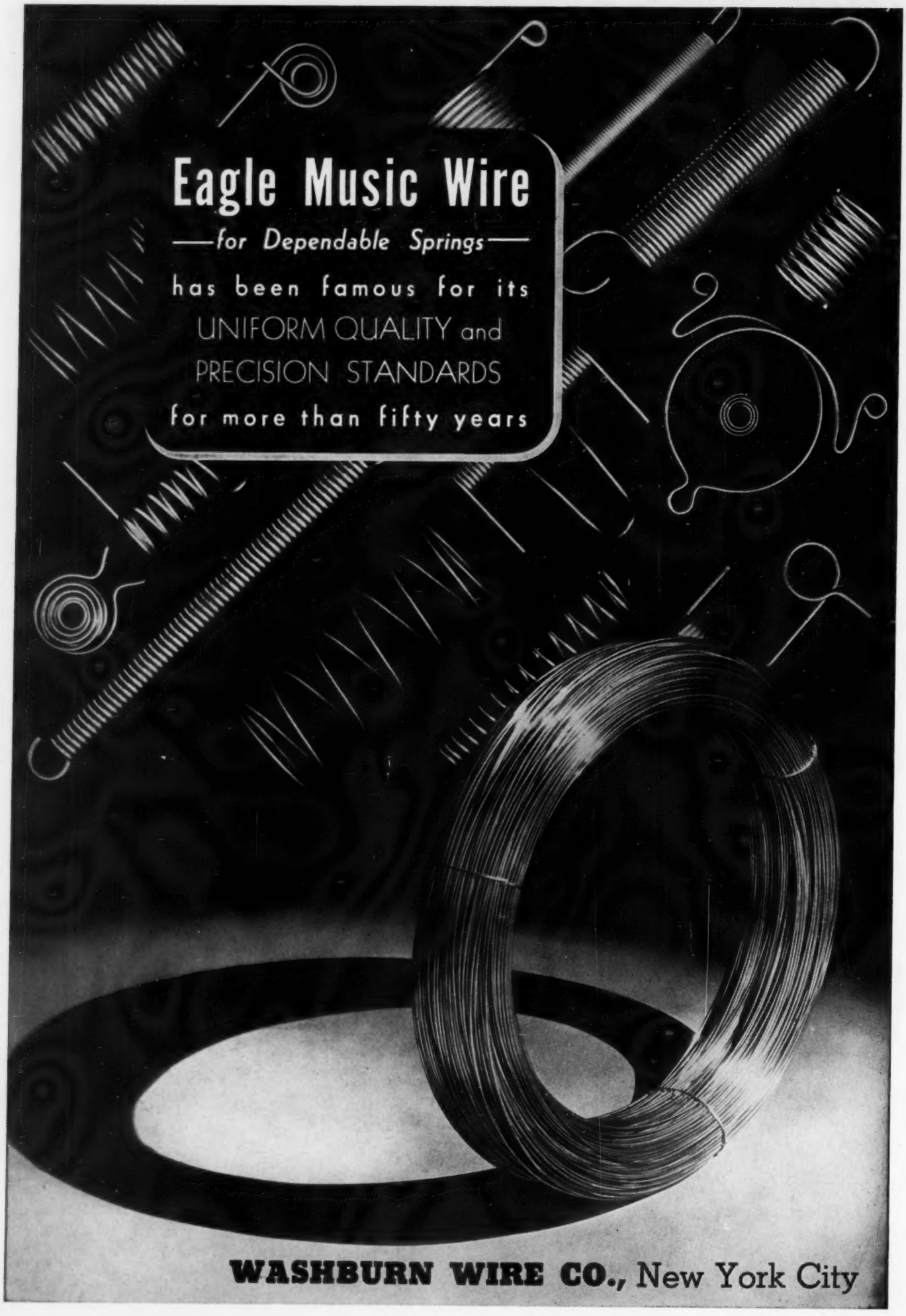
Your contribution of the practical mill know-how to this Mack-Hemp research assures constantly better metal-rolling production with improved Red Wabbler Rolls.

MACKINTOSH-HEMPHILL CO.



Makers of the rolls with the red wabblers

PITTSBURGH & MIDLAND, PA.


Eagle Music Wire
—for Dependable Springs—
has been famous for its
UNIFORM QUALITY and
PRECISION STANDARDS
for more than fifty years
WASHBURN WIRE CO., New York City

How Du Pont's improved solvents tackle your degreasing problems

UNDER VARIOUS TRADE NAMES, Du Pont Trichlorethylene and Perchlorethylene solvents for metal cleaning have served American industry successfully for many years. If you have used vapor degreasing solvents in your plant, no doubt you have used these solvents made by Du Pont.

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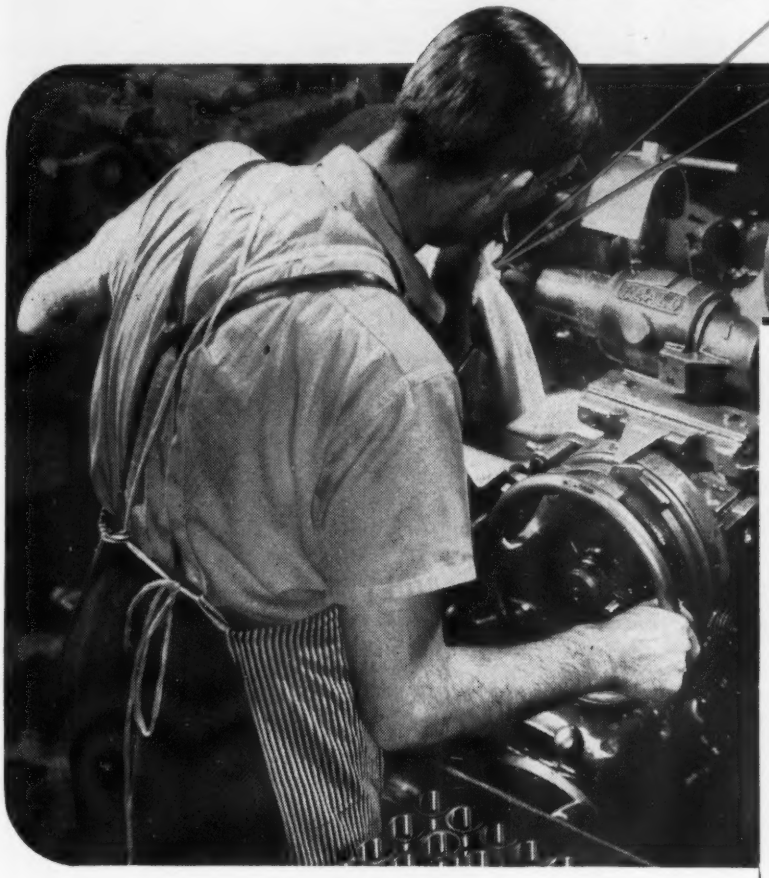
You benefit in 6 important ways when you use Gulf Soluble Cutting Oil



- Helps keep cutting tools cool and sharp
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- Emulsifies with all but the hardest water
- Nonfoaming
- Clean, pleasant odor

THE NEW GULF SOLUBLE CUTTING OIL combines the qualities you need to get improved production, increased tool life, and reduced down time for tool changes.

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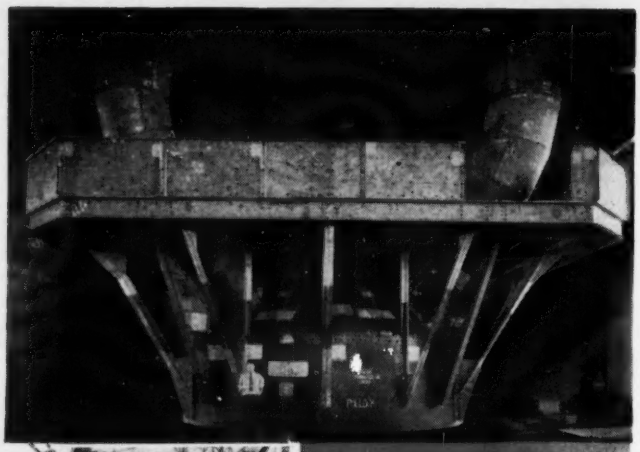
from
TOP
to
BOTTOM

POLLOCK gives you precision fitting in all steel plate construction work



Let Pollock handle your next steel plate fabrication and erection job, for Pollock skilled experts have had years of experience . . . can give you precision fitting every time! Before leaving the shop, all parts are assembled and carefully match-marked to insure close, accurate fits and speedy erection in the field. So carefully is this done that one customer — 12,000 miles away — has ordered steel work from Pollock three times, and each time was able to do his assembling quickly and easily. In another instance, the Pollock Company tore down and rebuilt the steel work for an entire blast furnace which was out of operation only 83 days, setting a new world record and saving over 70,000 tons of pig iron.

You, too, can benefit from Pollock's broad experience . . . its complete facilities and well-trained engineering-designing staffs. Whatever your fabricating job — large or small — heavy or light — put it up to Pollock and see how you save!

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Cinder and Slag Cars

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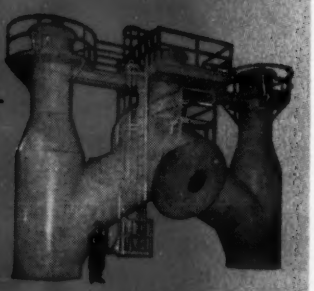

The WILLIAM B. POLLOCK CO.

YOUNGSTOWN, OHIO

STEEL PLATE CONSTRUCTION

ENGINEERS FABRICATORS ERECTORS

UNION PACIFIC

TREASURE MAP OF INDUSTRY

Kansas *

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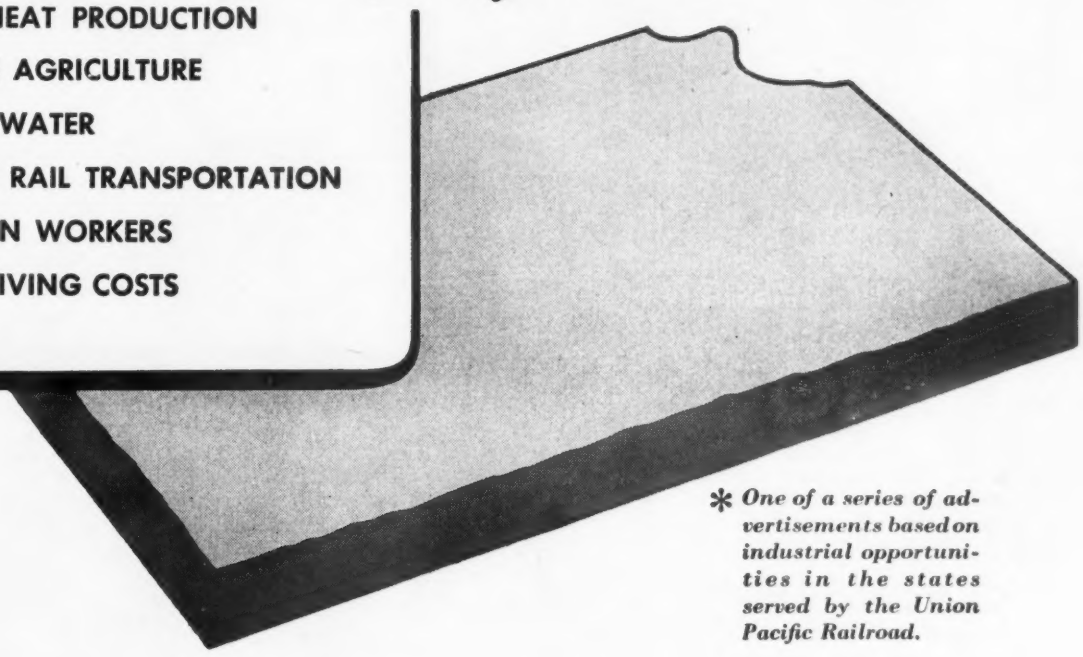
CENTER OF NATIONWIDE MARKET
PROGRESSIVE INDUSTRY
FIRST IN WHEAT PRODUCTION
PRODUCTIVE AGRICULTURE
ABUNDANT WATER
DEPENDABLE RAIL TRANSPORTATION
NATIVE BORN WORKERS
MODERATE LIVING COSTS



* *One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.*

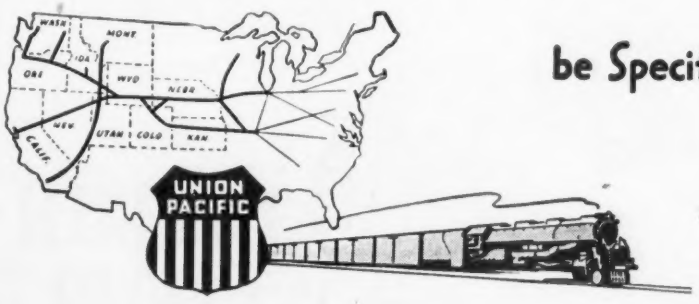
KANSAS—almost in the exact geographical center of the United States; an important factor to industries serving nationwide markets.

Agriculture is king. Kansas normally ranks first in wheat production. In addition to grains, vegetables and fruits, a large part of farm income is derived from livestock and poultry.

Kansas industry keeps step with agriculture. There are approximately 2,500 manufacturing and processing establishments. Over four million tons of coal are mined annually. Here is the largest natural gas field in the world. Eighteen principal rivers with two great watersheds provide an abundance of water. The population is 97 per cent native born.

★ ★ ★

Kansas . . . the hub of a rich market; a treasure chest of natural resources with dependable labor; outstanding public health record; moderate living costs; and excellent transportation over Union Pacific rails.



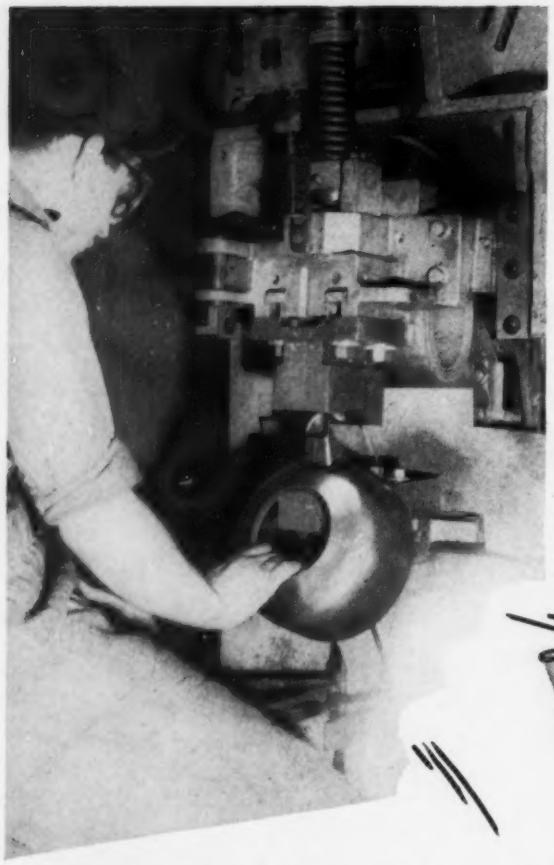
be Specific – say

"Union Pacific"

* *Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebraska, for information regarding industrial sites.*

UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE

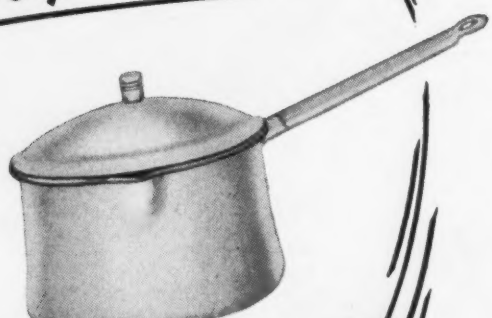


Resistance Welding

HAS REDUCED OUR OVER-ALL COSTS

50%

300 per hour



450 per hour

600 per hour

"Every installation of resistance welding equipment (we now have well over 100 welders) has been a success from the points of increased production, economy, and improved appearance. The adoption of this method has reduced our over all costs 50%; on some applications, savings run as high as 75%."

GENERAL STEEL WARES

General Steel Wares, Toronto, London, Montreal, and Vancouver, Canada, uses spot, flash-butt and seam welding for enameled ware, galvanized ware, milk cans, refrigerators, stoves, garbage pails, and many other products.

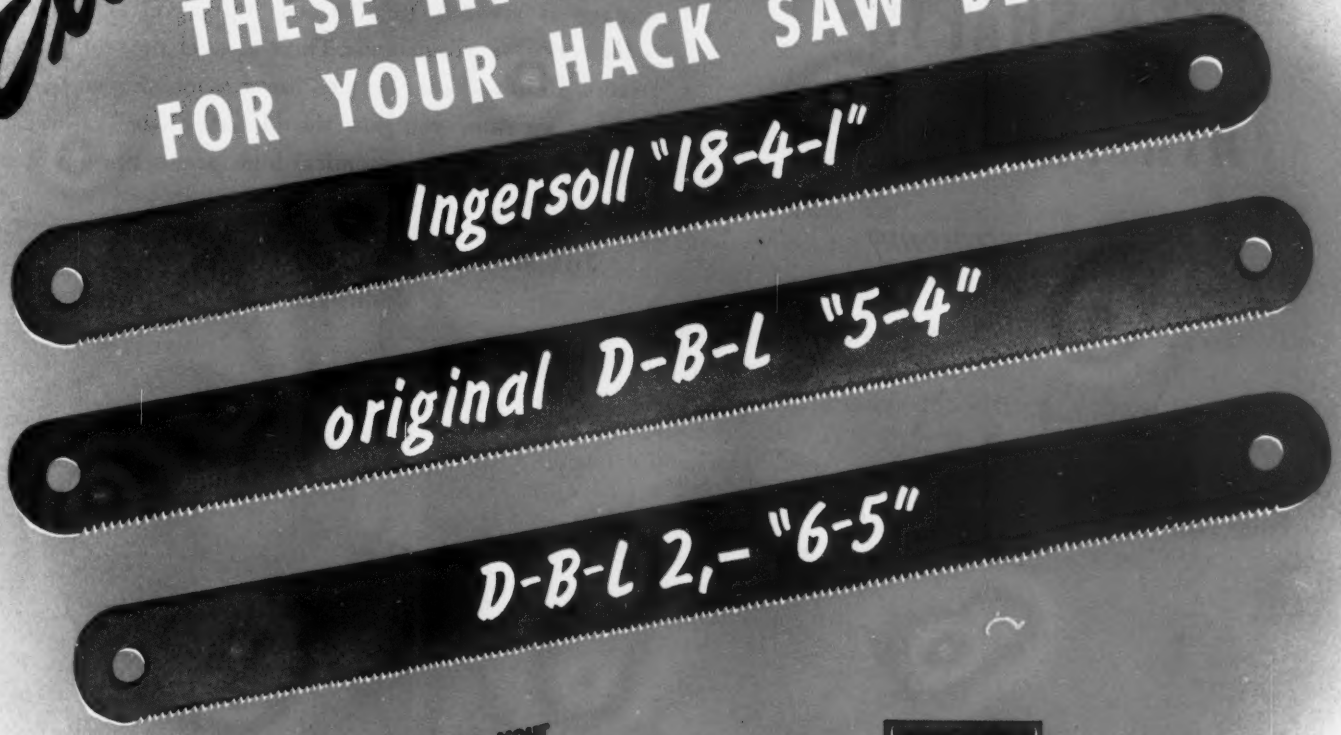
Will the use of resistance welding improve your quality and your production? T-W can answer this question graphically after they have studied your product. Consult us direct or through a T-W field man.

THE TAYLOR-WINFIELD CORPORATION
WARREN, OHIO

TAYLOR-WINFIELD
RESISTANCE WELDERS

Extra TOUGH! Extra DURABLE!

THESE INGERSOLL STEELS FOR YOUR HACK SAW BLADES



Next time you order hack saw blades from your regular supplier, specify blades made of Ingersoll 18-4-1 or Ingersoll D-B-L Steel. That way you're sure of getting blades that can take plenty of punishment . . . blades that offer complete hack saw satisfaction, because Ingersoll steels insure—

1. Tougher Cutting Edges
2. Higher Impact Resistance
3. Relative Freedom from Decarburization

No wonder blades made of Ingersoll Hack Saw Steels have such an outstanding record of on-the-job performance and are considered "master tools" by master mechanics all over America.

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INGERSOLL Steel Division

Borg-Warner Corporation • New Castle, Indiana

Plants: New Castle, Indiana • Chicago, Illinois • Kalamazoo, Michigan

INGERSOLL "18-4-1" INGERSOLL D-B-L* Hack Saw Steels

*Furnished in the original D-B-L Regular, -"5-4" and D-B-L 2, -"6-5".

INGERSOLL *Special* STEELS FOR *Special* USES

Alloy Steels
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IngAclad (Stainless-Clad Steel)
Stainless Steels and Saw Steels, including "18-4-1" and Molybdenum and D-B-L Hack Saw Steels.

STEP-SHAFTS AIR-TRACED

for greater economy

Turning step-shafts? Here's how to save—on setup time, on resharpening time, on machining costs—*and on original machine investment.*

The gear blank shown is a typical example. Turned on a multiple-tool automatic, the setup requires anywhere from 2 to 3½ hours. When AIR-TRACED, although machining time is the same, setup is *only ten minutes or less.* There's only one lathe tool to sharpen—and the machine is easily adaptable to a wide range of work—boring or turning—contours, tapers, step-shafts. Accuracy is greater, too, because operation is stepless, continuous—and *automatic.* There's less chance for human errors. Result? Fewer rejects, lower machining costs.

May we show you how the Monarch Air-Tracer can give you accurate, economical high production on *your* class of work? Ask for bulletin 2601.

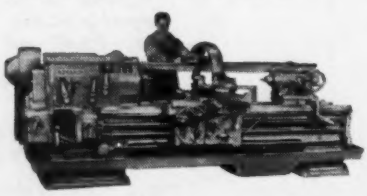
THE MONARCH MACHINE TOOL COMPANY
Sidney, Ohio

Part—Main Drive Gear; Material—SAE 4027; Time Per Piece, Completely Machined—3.16 Minutes; Setup Time—10 Minutes.

FOR SPEED, ACCURACY AND FINISH, THE MONARCH AIR-TRACER*

1. **Stepless cutting-tool motion provides a superior continuous finish.**
2. **Setup times averaging five to ten minutes permit profitable use for a wide variety of small-lot production jobs.**
3. **Automatic yet versatile operation results in economical, accurate high production.**

Available exclusively on the new Monarch Lathes.



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Cutting Costs, Increasing Output with Modern Machine Tools—Broaching
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Preparing Steel for Enameling
Brazing 12% Cr Low Carbon Steel
Convection Annealing Tin Plate

STEEL

The Magazine of Metalworking and Metalproducing

VOL. 121, NO. 2 JULY 14, 1947

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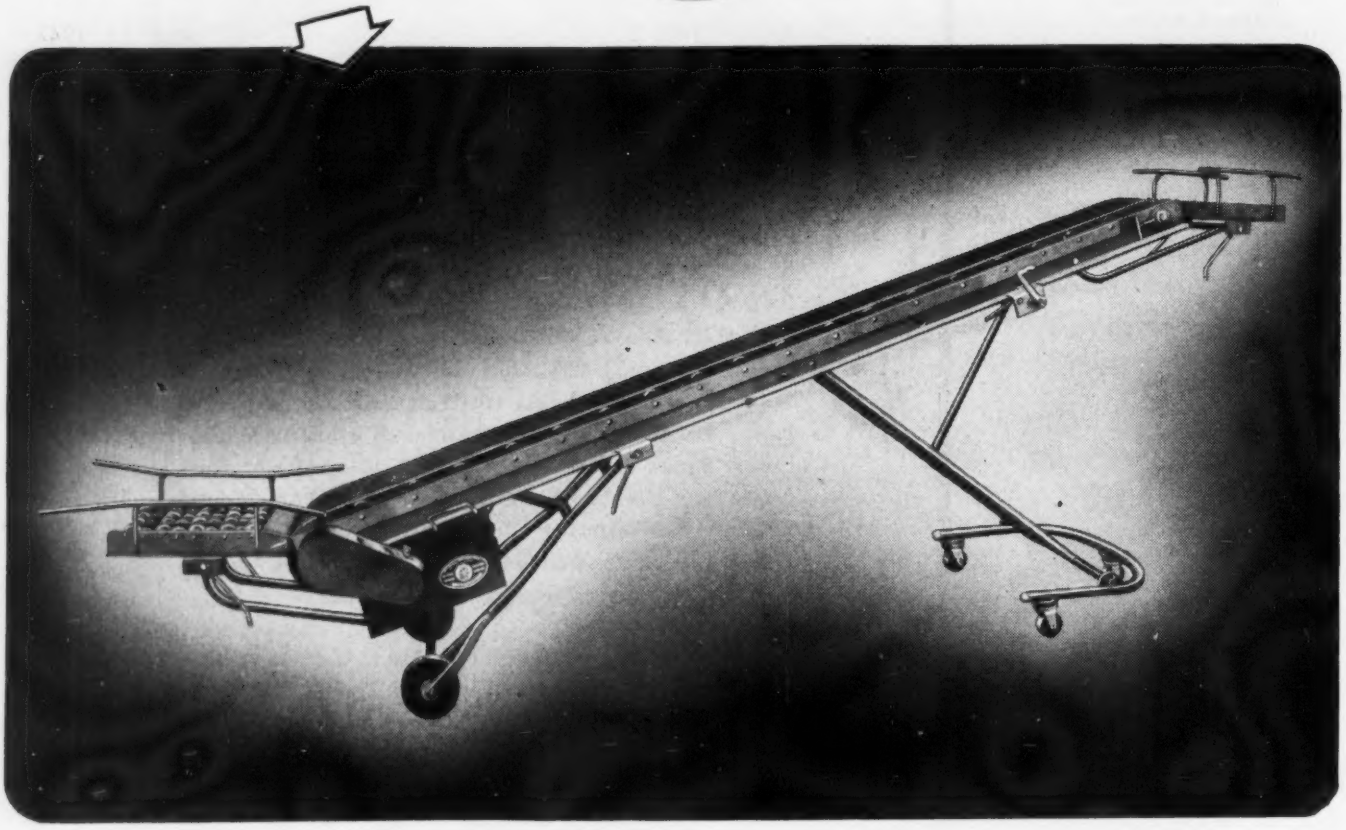
Save with YOUR SLAVE, *Stevedore, jr.*



The right machine . . . the elimination of grunt and fatigue from lifting — these add up to time and labor economy. The Stevedore, Jr. is a slave for work . . . you are his master. Rapids-Standard can give immediate shipment on some models *(with exclusive Rapid-Lock, Cable-Lift, and Horseshoe Dolly features)* — with or without self-supporting head and tail sections. Use it as a separate "booster" . . . or connect with Rapid-Roller and Rapid-Wheel Gravity Conveyor.

Write today for more data or call the local Rapids-Standard man listed in the yellow pages of your telephone directory.

Manufacturers of
STEEL FORGED CASTERS · TRUCKS · CONVEYORS · POWER BOOSTERS

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Portable power belt conveyor.

STEVEDORE, Jr.
Light portable power belt conveyor.

FLOOR-VEYOR
Permanent power belt conveyor for floor-to-floor use.

RAPID-WHEEL CONVEYORS
Flexible gravity wheel conveyor.

RAPID-ROLLER CONVEYORS
Versatile gravity roller conveyor.

Sales Division — 335 Peoples National Bank Bldg., Grand Rapids 2, Michigan

July 14, 1947

Right vs Might

At a meeting of the American Iron & Steel Institute on May 25, 1917, Judge E. H. Gary, then president of the institute, in commenting on World War I, said that "the Allies are contending that Right makes Might; their enemies that Might makes Right."

Since that date the world has witnessed an ever increasing conflict between those who want right to prevail and those who would rule by might. During the thirties it was the Mussolinis, Hitlers and Hirohitos who, invoking their might to trample upon the rights of people in weaker nations, sowed the seeds for World War II. Strong nations such as the United States and Great Britain, which by decisive action could have blocked these acts of aggression, chose to pursue a policy of appeasement. In so doing, they postponed the inevitable showdown until they were forced to face it in World War II.

Here at home we have had conflict between the exponents of right and might which bears a striking resemblance to the controversy on the international stage. Since 1933 the power of labor unions has been increasing. On numerous occasions since the war union leaders have taken advantage of circumstances to impose their might upon the public without respect for the rights of majorities.

The most recent spectacle of this kind was the settlement which John L. Lewis forced upon the coal operators. He knew that the operators—contemplating the domestic and international repercussions of a prolonged strike, as well as the possibility of another seizure of mines by the government—would be forced to accede to his demands. They did exactly what he knew they would do.

Thus today we are at the same stage in the conflict between might and right in domestic affairs as we were in the thirties when we were appeasing Mussolini, Hitler and Hirohito in world affairs. Again we have chosen to resort to expediency. Again we have postponed the showdown.

If there is a single redeeming feature of the coal wage settlement it is that the action of Mr. Lewis in exploiting his power at a time when the nation was at his mercy proves conclusively that the Taft-Hartley act is a move in the right direction and that its chief defect is that it does not go far enough in curbing the power of labor dictators.

At home and abroad the fight must go on until people who are right can prevail over those who have only might on their side.

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FOR SMALL BUSINESS: Reports from Washington indicate that one of the major legislative programs of the 1948 session of the 80th Congress, which will convene next January, will deal with government policies affecting the nation's small business.

That some remedial action is overdue must be evident to everybody in industry, including the executives of the largest corporations. If the present trend of mergers, consolidations and acquisitions continues unchecked we will wind up with an industry of corporate giants so powerful that government controls more stringent than anything we have experienced to date will become necessary.

The problem is not as much one of lack of opportunity for individuals to launch new businesses as it is one of inducing small businesses to refrain from selling out to big competitors. In spite of complexities of governmental regulations, it is still relatively easy for an ambitious entrepreneur to engage in business on a shoestring. The trick is to make it attractive for him to continue on his own after he has made the grade.

Some small businessmen who write us on this

(OVER)

AS THE EDITOR VIEWS THE NEWS

subject say that certain federal tax provisions hurt small business severely. They contend that the threat that one must pay out 70 per cent of earnings in dividends is particularly unfair in many instances.

This is one of many aggravations. Congress will do well to air every factor in the situation. —p. 60

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LIKE FILLING A JUG: For months the cry has been "How can I get more steel to keep my plant running?" Now the query is: "Does the steel industry realize that the increased demand for my product is not a flash in the pan? Will the industry have enough capacity to take care of my greater needs over the long-term future?"

One answer is that historically steel capacity always has kept well ahead of normal demand and undoubtedly will continue to do so.

The present effort to fill the wants of a starved market is like filling a jug at a tap. We turn on the faucet and the jug seems to fill slowly. Just as we are becoming impatient at the delay, water fills to the neck of the jug and before we know it, water is splashing all over us.

If steel production continues at its present high rate, excess output soon will be splashing over in some finished steel markets. —pp. 51, 64, 145

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STEEP PRICE TO PAY: Short-range repercussions of the coal wage settlement are fairly clear-cut. On the favorable side is the assurance that coal production will be maintained at a high level. In the past, reducing hours of work per week has not reduced weekly output. It remains to be seen whether this will prove true in the present circumstances.

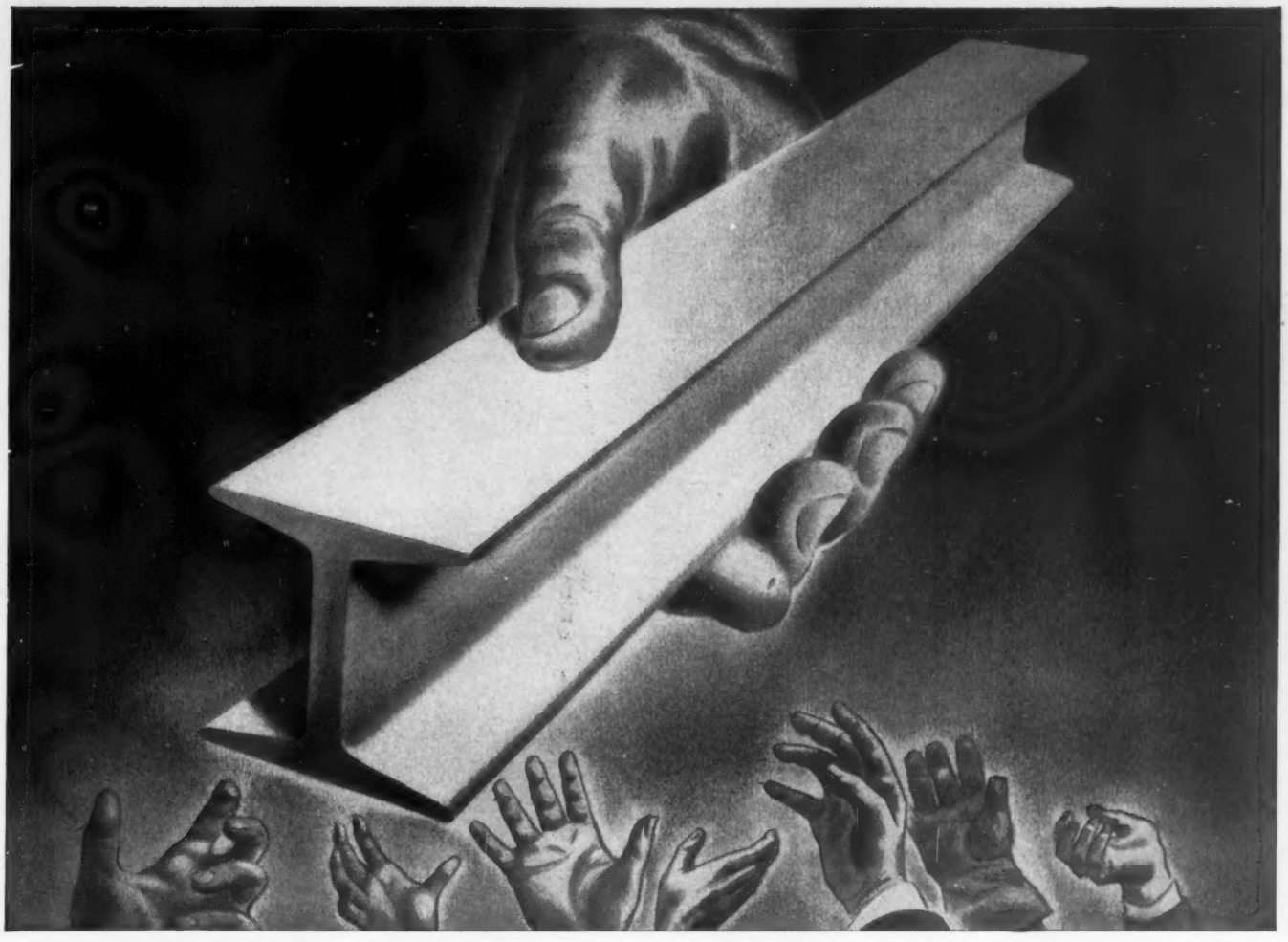
On the other side of the ledger is the strong inflationary impetus of the wage agreement. Prices of coal and steel will go up rather promptly and these advances will cause upward revisions in the prices of many items which are related to coal and fuel. Finally there is the effect of the coal settlement upon the future wage demands of workers in many branches of industry.

All in all, consumers will be called upon to pay a steep price for the implied assurance that the mines will continue to operate at a high level of capacity. —p. 54

SIGNS OF THE TIMES: One of the 95,000 motor vehicles which rolled off assembly lines last week was the four-millionth passenger car built since postwar production began in July, 1945. With 2,200,000 motor trucks and coaches assembled during this period (p. 67), total postwar output has been 6,200,000 vehicles. . . . Years ago builders of grinding machines were denied membership in the National Machine Tool Builders' Association because grinding machines were not considered to be bona fide machine tools in that they did not remove metal progressively "in the form of chips." Fortunately that error long since has been corrected. Today of 190 company members in the association (p. 80), 66 build grinding machinery. Of these 66, 25 specialize in grinding machines as their major activity. . . . The petroleum industry will spend more than $1.1 billion during 1947 and 1948 for refinery equipment (p. 64) to increase present capacity and to replace old and obsolete facilities. . . . It is predicted that railroad freight car loadings in the third quarter of 1947 will be 4.7 per cent in excess of loadings during the comparable period last year. With fewer cars in operation today than at the beginning of 1946, some authorities fear a car shortage in the late summer (p. 72) that will be more serious than any yet experienced. . . . Corrosivity of the atmosphere varies widely according to local conditions. At Kure Beach, N. C., where a corrosion testing station has been maintained by International Nickel Co. and Dow Chemical Co. for 12 years (p. 88), corrodibility of the atmosphere is rated at 38. In the industrial-marine atmosphere of Kearney, N. J. it is 52, in the industrial atmosphere of Pittsburgh 65 and in the dry inland atmosphere of Khartoum, Egypt, 1. . . . It is estimated that the capacity of German steelworks that could be made operable, excluding that which has been badly damaged and which has been dismantled for reparations (p. 58), is about 12,000,000 tons annually. . . . A new high speed punch press is capable of producing ferrous and nonferrous stampings at a rate of 1800 strokes per minute. The dies of the press are actuated by rotary motion (p. 98) in contrast to the reciprocal motion in conventional presses. . . . Faithfully performing its traditional role as a sensitive barometer of price movements, steelmaking scrap has advanced $4 in Cleveland (p. 145), several weeks ahead of the anticipated rise in steel prices.

E. L. Shaner

EDITOR-IN-CHIEF



Brother, can you spare a beam?

Steel is like money. When you need it, you need it *badly*. That's why we have many steel plants to give next-door service most anywhere.

But lately it's getting so we hesitate to open the mail or answer the phone. We *know* there will be friends asking for steel—steel they need badly—and often we just are not able to fill the bill.

And here's what's causing it all

For a while it looked as though production would soon catch up with demand. Now that time seems more distant. The many things holding up top steel production have been slow to clear away. Unpredictable stoppages keep popping up, and shortages have brought other delays. You know about many of them. We've been doing our best, but for reasons beyond our control, we're still getting orders we can't fill.

But remember this:

One of these years the steel situation is going to change for the better. When that happens our plants will be among the first to stock products now hard to get and we'll burn up the roads rushing your steel to you. In preparation for that day, we're improving and expanding facilities, to protect the quality of Ryerson steel and ship it to you faster.

We are even now building a new plant and adding extensively to equipment at 12 others.

Meanwhile, the steel you need or a practical alternate may be in stock. So contact the nearest Ryerson plant with the full knowledge that we will do everything in our power to work with you.

JOSEPH T. RYERSON & SON, Inc. Plants at: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles.

RYERSON STEEL

It takes *GOOD MEN* to make *GOOD STEEL*

Raw materials, plant facilities, production methods . . . yes, all are essential in the making of quality steel.

But most important of all is *men*—good men. Inland's steelmen are among the country's finest. They are men who have spent their lives in steelmaking . . . men who set their standards high and drive themselves and others to meet these standards . . . men who take personal pride in the steel they produce. Such are the men who make your Inland steel—the steel you can depend upon.

INLAND STEEL

INLAND STEEL COMPANY

38 South Dearborn Street, Chicago 3, Illinois

Sales Offices: Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul

BARS • STRUCTURALS • PLATES • SHEETS • STRIP • TIN PLATE • FLOOR PLATE
PILING • REINFORCING BARS • RAILS • TRACK ACCESSORIES

What most metalworking companies want right now—flat-rolled steel. Above photo shows a load of coils being conveyed from the electrolytic cleaners in the annealing department at the Irvin Works of Carnegie-Illinois Steel Corp.

Sheet-Strip Shortage Continues Acute, Despite Record Output

Consuming capacity of metalworking industries increased tremendously during war period. Expansion program of producing industry hampered by strikes in plants of equipment suppliers. Three and a half million tons capacity being added

"WHERE is all the steel going?"

This continues to be one of the most frequently heard questions wherever metalworking executives meet. With steel production rolling along at peak peacetime levels (more than 42 million tons in the first half of 1947), many consumers cannot understand why they cannot buy the steel they need.

Nine times out of ten, the questioners are talking about sheet and strip, both hot and cold-rolled, which since the war has been the most critical of the major finished steel products, and for which no relief is in early prospect.

In STEEL's recent survey of metalworking companies' materials inventories and deliveries (STEEL, June 16, p. 57), 81 per cent of companies reported they had less than 60 days' stocks of hot-rolled sheet and strip and 84 per cent had less than 60 days' supply of cold-rolled sheet and strip. Only 18.5 per cent were able to obtain deliveries of hot-rolled sheet and strip in two months and only 14.5 per cent were promised deliveries of cold-rolled materials in the same period. Inventory and delivery situations in these materials were little improved over September, 1946, when a similar study was made.

The obvious answer to the steel-hungry metalworking companies is that capacity for fabricating steel into end products, or into components to be used in end products, was expanded tremendously during the war years—more than was capacity to produce steel. With postwar demand for both consumer and capital goods made of steel at abnormally high levels, these expanded metalworking companies are attempting to operate at capacity, often with multiple shifts.

The result is that the steel industry, which underwent a more moderate wartime expansion, has to date been unable to catch up with the present abnormal demand from a greatly increased consuming industry. Steel mills further have been hampered in catching up with demand by the 1946 steel and coal strikes, which caused a loss in production of 11 million tons of finished steel in that year when consumers were trying to build inventories up to a working level.

From 1939 to 1946, manufacturers of electrical equipment increased their capacity by almost 93 per cent, machinery builders by 80 per cent, transportation equipment manufacturers by 75 per cent, and makers of fabricated metal products by 66 per cent. Additional capacity has been added during the first half of 1947.

During the same period, basic steelmaking capacity was increased about 12 per cent, from approximately 82 million to 92 million tons. Finishing capacity expansions during this interval were directed toward the production of materials urgently needed in the prosecution of the war and only part of these facilities are of value in increasing output of the flat-rolled steel so urgently in demand today.

Most steelmaking officials believe that present ingot capacity is not only in excess of normal consumption but that it also is more than enough to supply present needs, exclusive of that needed for rehabilitation of inventories. Balance between supply and demand already has been reached on a few products such as stainless and alloy steel and cold-drawn bars in large sizes, and will be reached for most products by year's end. Flat-rolled products likely will be an exception and balance between supply and demand on sheet and strip is not expected before 1948.

The question of whether or not steelmaking capacity is adequate for postwar demands is one that has been argued extensively since the war's end. Last week, the Senate Small Business subcommittee investigating the steel situation, took up the issue in Washington with Walter S. Tower, president of the American Iron & Steel Institute, on the stand. Mr. Tower pointed out that shipments of sheet and strip in the first four months this year were close to 6 million tons, a record rate for all time, that total finished steel shipments for the first six months exceeded 31 million tons, and

that indicated ingot production for the year was close to 85 million tons, 20 million tons more than any peacetime tonnage this country has ever been able to consume.

Mr. Tower told the committee that present capacities in this country "are not far from being equal to half of all the blast furnace and steel capacity now in condition to be operated in the whole world." The Institute reports show the operating rate for the industry from the beginning of 1947 until the recent coal holiday has been above 90 per cent of capacity, one of the longest peacetime intervals of operations sustained at such a high rate.

In no single peacetime year between 1900 and 1940 was the steel industry required to operate above 90 per cent of capacity. In only 7 years was the production rate above 80 per cent; during 10 years the production rate was in the 70s; the rate during another 10 years was in the 60s; for three years it was in the 50s; and for the remaining 8 years operations averaged 36.1 per cent.

Notwithstanding the remarkable production achievement of the steel industry since the war, the shortage of steel products persists, especially in the flat-rolled items.

Before this year, the maximum production of sheet and strip was in 1941 when nearly 16 million tons were produced. Sheet-strip output in 1946 totaled only about 14 million tons, due to production lost as result of the steel and coal strikes. This year's production should exceed 17 million tons, an all-time record.

To meet the anticipated increase in flat-rolled requirements, the industry before the war had initiated an extensive expansion program for these items. Completion of the program was delayed by the war and since then has been retarded by strikes in the plants of equipment suppliers. When all these facilities actually come into production, the industry sheet-strip capacity will be stepped up to more than 19 million, or 20 per cent above the 1941 peak output.

SHEET-STRIP SHIPMENTS

Year	Net Tons	Year	Net Tons
1946	14,171,124	1941	15,743,829
1945	13,557,735	1940	12,325,257
1944	12,151,825	1939	10,341,577
1943	11,045,164	1938	6,299,589
1942	10,736,859	1937	11,167,183

A year ago, it was expected that sheet and strip mill capacities as of July 1, 1947, would show an increase of 3,180,-500 tons over the figure for July 1, 1941. The actual increase still is about 2,000,-000 tons short of expectations. The delay has been due to strikes in plants of suppliers, particularly those producing motors and electrical equipment, delays in receipts of rolling and finishing equipment, shortages in certain skilled labor classifications, shortage of building materials, and other factors resulting from postwar adjustments.

The present schedule of expansion indicates that sheet and strip capacities by July, 1948, will still be a little short of the original schedule, but that by the end of 1948 the original schedule will be exceeded by 440,000 tons.

Latest survey of scheduled increases in sheet-strip capacity indicates that by the end of 1947, the net increase over July, 1941, will be 1,953,200 net tons; by July, 1948, the net increase over mid-1941 will be 2,993,200 net tons; and by the end of 1948, the net increase over 1941 will be 3,620,975 net tons.

A brief summary of the expansion programs involving cold-reduction mills, and latest estimated completion dates, include:

Carnegie-Illinois Steel Corp., 54-in. 4-high mill, at Gary, Ind., by third quarter this year; Columbia Steel Co., 56-in. 4-high, second quarter 1948; Tennessee Coal, Iron & Railroad Co., 54-in. 4-high, first quarter 1949. Each of these mills will have a rated capacity of 400,000 tons annually.

Bethlehem Steel Co. only recently started operating its new 54-in. 4-high mill at Sparrows Point, Md., rated at 400,000 tons. Toward the close of this year Granite City Steel Co. expects to have its new 54-in. 4-high unit in operation, rated at 270,000 tons annually. Also late this year the new 42-in. mill at Jones & Laughlin Steel Corp.'s Aliquippa Works is expected to be operating, rated at 400,000 tons annually. Youngstown Sheet & Tube Co. plans to have its new 56-in. mill at Indiana Harbor in operation by first quarter next year, rated at 240,000 tons annually. The new 93-in. mill at Great Lakes Steel Corp.'s Ecorse, Mich., plant is scheduled for completion late this year and is rated at 550,000 tons. Weirton Steel Co. only recently started operating its new 42-inch mill, rated at 400,000 tons annually.

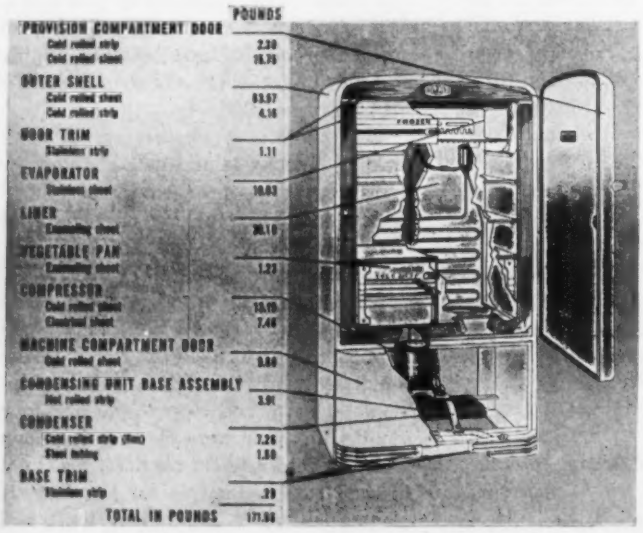
Some steel producers are speeding up present cold-reduction facilities. Inland Steel Co., for example, plans to complete such a program by first half of 1948 on its 42 and 54-in. mills, thereby increasing capacity 240,000 tons. Similar expansion is planned at the Gary Works of Carnegie-Illinois Steel Corp. on company's 42 and 84-in. mills, resulting in increased potential capacity of 140,000 tons. This will not be completed until 1949.

Capacity To Rise 4 Million Tons

The above new installations represent an increase in potential capacity of about 4 million tons in cold-rolled sheet and strip. However, actual tonnage available will be dependent on product mix in respect to output of tin plate, electrical, enameling and galvanizing sheet output. This increased capacity will be further offset by eventual discontinuance of production on hand mills (estimated to represent about 350,000 tons annual capacity) which are being utilized today because of the acute pressure for sheets and strip. The industry also is expanding hot-rolled sheet production, by means of speeding up present mills and installing new units, to match increased hot-rolled steel requirements of the new cold-reduction mills.

A number of new specialty cold-reduction units will also be brought into the industry's new capacity picture late this year and 1948. These facilities include the following:

Allegheny Ludlum Steel Corp.'s 28-in. 4-high unit at West Leechburg Works is scheduled to be in operation this quarter and is rated at 24,000 tons annually. American Steel & Wire Co. has on order an 8-in. Sendzimir precision cold mill for the Worcester, Mass., plant, which



A typical household refrigerator requires about 170 *lb of sheet and strip steel, as indicated in the accompanying diagram prepared by the American Iron & Steel Institute. Included are most of the common flat-rolled items, hot and cold-rolled strip, cold-rolled sheet, electrical sheet, enameling sheet and stainless sheet and strip*

will replace other facilities. American Rolling Mill Co. plans installation of a 42-in. Sendzimir mill by first quarter 1948 for the Butler, Pa., works, rated at 30,000 tons annually. Crucible Steel Co. of America has scheduled a 54-in. 4-high 3-stand mill at Midland Works, rated at 28,500 tons, to be completed late next year. Jessop Steel Co., Washington, Pa., likely will have its 19.5-in. Sendzimir mill in operation early next year. Kaiser Co. Inc. plans to have its 18-in. 4-high reversing mill ready for operation late fourth quarter, rated at 20,000 tons. Republic Steel Corp.'s 66 and 54-in. 4-high reversing mills at the Massillon Works also are scheduled for fourth quarter. Sharon Steel Corp., Sharon, Pa., has a 22-in. 4-high reversing mill on order. Thomas Steel Co., Warren, O., has ordered a 30-in. Sendzimir mill.

Specialty cold reduction mills recently placed in operation include: a 22-in. 4-high unit for Acme Steel Co., Chicago, rated at 100,000 tons annually; Eastern Stainless Steel Corp., Baltimore, 48-in. 4-high reversing, replacing other equipment; and Washington Steel Corp., 42-in. Sendzimir.

These new specialty facilities represent about 200,000 tons of additional cold-rolled capacity, after making an allowance for equipment retired.

Original plans called for most of the new sheet and strip mills to be in and operating by the end of this year, with several of them actually in production early this year. The most serious delaying factor has been the difficulty in getting delivery of electrical equipment and motors as a direct result of the prolonged strikes and material shortages which General Electric Co., Westinghouse Electric Corp., and Allis-Chalmers Mfg. Co. have had to face since the war.

Latest estimates as to when these planned facilities will be in and operating, now extend well into 1948. However, in spite of this, and based upon the expectation that at least some of the planned new facilities will come into partial operation during the latter months this year, it is now estimated (excluding possibility of work stoppages) that more than 17 million tons of sheets and strip should be produced this year.

Every user of sheets and strip, including manufacturers of automobiles and trucks, metal furniture, steel drums and containers, kitchen cabinets, pressed metal plumbing ware, and a host of others, is short of current requirements. There have been but a very few instances reported to date of customers holding up portion of monthly allotments because of their inventory position in relation to projected production schedules.

Sheet and strip supply situation is further complicated by another important product, namely, tin plate, which up to a certain state in its production, uses the same facilities for its manufacture as do sheets and strip. In addition to the fact that production of tin plate is given preference in view of current world food shortage, preferred status also must be given to the output of steel for other important programs such as federal housing, agricultural implements, freight car construction, and for export.

Discussion of the steel demand-supply situation invites consideration of the relationship between ingot and finishing capacity. The total of maximum annual potential finishing capacities for all products, embracing the total tonnage of each product that could be produced under full operations, assuming use of all available facilities and without regard for the availability of ingot, amounts to about 130 million tons. These figures, of course, include considerable duplication, as for those types of rolling mills which produce more than one product the full capacity for each product is included. Thus for a continuous sheet-strip mill producing both plates and sheets the maximum potential capacity figures include its full capacity to produce each product it is capable of rolling.

Effective finishing capacity is 67 or 68 net tons annually.

The finishing capacity setup permits a certain leeway to mills in allocating steel to finishing units and naturally the finished products returning the most favorable profits are favored. This has resulted in a shortage of some steel items showing a loss or low profit under the current price schedule.

It is possible that when steelmakers readjust price schedules within the next few weeks, this will be taken into consideration, and prices of products now showing a loss or small profit will be increased enough to encourage increased output.

General Electric Reports Big Gain in Orders Received

Orders received by General Electric Co., Schenectady, N. Y., during the first half of 1947 totaled $572,597,000, an increase of 47 per cent over the first half of 1946, during part of which the company was handicapped by a strike, and 28 per cent above the total for the best full calendar year prior to 1940.

Present, Past and Pending

■ NEW CLEVELAND-CLIFFS IRON CO. EMERGES

CLEVELAND—Merger of the old Cleveland-Cliffs Iron Co. and the Cliffs Corp. was effected last week, bringing into existence a new Cleveland-Cliffs Iron Co. with assets of $95 million.

■ GM CAR AND TRUCK PRODUCTION RISES

DETROIT—Production of General Motors passenger cars and trucks in June totaled 155,609, an increase over May's 135,276 but short of accomplishments in March and April.

■ EARNINGS OF LUKENS STEEL CO. IMPROVE

COATESVILLE, PA.—Lukens Steel Co. and subsidiaries report a net profit of $1,283,696 for the 36 weeks ended June 14, compared with loss of $830,188 for the corresponding period of last year.

■ TUCKER CAR OUTPUT MAY BEGIN ABOUT SEPT. 15

WASHINGTON—At private showing of the new Tucker automobile for congressmen, government officials and diplomats here, it was reported assembly line production of the car would begin about Sept. 15.

■ REGISTRATIONS HEAVY FOR MACHINE TOOL SHOW

CHICAGO—Heavy flow of advance registrations from both the United States and abroad has prompted officials for the Machine Tool Show to be held in the Dodge-Chicago plant, here, Sept. 17 to 26 to predict the original estimate of 100,000 visitors may be exceeded.

■ NEW TANK CARS BRIGHTEN FUEL OUTLOOK

WASHINGTON—Improvement in production of new railroad tank cars is brightening the outlook for movement of fuel oil and gasoline next winter, Col. J. Monroe Johnson, director, Office of Defense Transportation, told a congressional investigating committee last week. Tank car output in the first half of 1947 was up more than 300 per cent over second half of 1946.

■ TAX HEARINGS TO BE RECESSED UNTIL NOVEMBER

WASHINGTON—Current tax hearings of the House Ways and Means Committee will be terminated about the week beginning July 14 and will be resumed in November, with the committee planning to complete this year a new internal revenue bill for submission to Congress next January.

Coal Wage Rise To Boost Steel Prices

Upward adjustment averaging $5 a ton expected within month. Other metalworking costs will be affected

In agreeing to keep his miners at work another year, John L. Lewis signs with northern and midwestern soft coal operators a wage contract which demonstrates anew that he drives only hard bargains. Seated, left to right: John O'Leary, vice president, United Mine Workers-AFL; Mr. Lewis; and Thomas Kennedy, UMW secretary-treasurer. Standing, left to right: Joseph Angelo, UMW board member; Ezra Van Horn, chairman, joint wage conference; Charles O'Neill, chairman, northern coal operators negotiating committee; and Henry M. Moses, negotiator for U. S. Steel Corp. NEA photo

PRODUCTION costs in the metalworking industry are destined to move up another notch as a result of the steep wage increase which bought labor peace in the coal mining industry.

First effect to be felt will be an increase in the price of raw materials, particularly steel, the increase for which, according to steel industry sources, will average $5 a ton. Subsequent effects quite logically could be higher rates for electric power and transportation, both heavily dependent on coal for fuel. It is even conceivable a higher cost of living may grow out of an increase in coal prices and eventually spur labor generally to seek higher wages. Also other costs of operations would rise as effects of a coal price increase fan out through all industry.

Raw material prices will be the first to be announced for they are not dependent on approval from governmental agencies as are electric power and transportation rates and are not bound by contracts as are labor rates.

Coal Price May Rise 85 Cents

With coal industry sources estimating the miners' 44½-cent-an-hour wage hike will boost the price of coal 85 cents a ton, the direct manufacturing cost alone of a ton of finished steel would be raised by around $1.27 a ton, for to produce a ton of finished steel requires approximately 1½ tons of coal. In addition, steel companies would feel the coal price increase in other ways, such as in increased cost of materials, transportation, power, and possibly labor. Consequently, their increased costs per ton of finished steel eventually would total in excess of $1.27.

Because prices of goods and services bought by the steel industry have been rising substantially, with the full impact not yet felt, and considering the fact steel prices have not risen sufficiently to cover those upbound costs it will be necessary to make a price increase to cover them and the boosts that will come from higher coal prices, steel industry spokesmen explained. This, they hint, will average $5 a ton.

As U. S. Steel Corp. played a leading role in formulating the new agreement with John L. Lewis and the United Mine Workers-AFL it was viewed as probable that the corporation might also take the lead in announcing price advances, with other members of the industry following as has been customary. However, it was thought that the corporation would take no hasty action. While recommendations were being formulated by U. S. Steel last week for price increases on various steel products it was expected no final decision would be reached before the quarterly meeting of the corporation's directors July 29.

The directors must face the realistic situation of the higher costs and the relatively low steel prices with the obligation to maintain the financial strength of the corporation.

In the case of the U. S. Steel Corp. alone the wage increase granted to the steelworkers earlier in the year amounted to about $75 million a year. Added to this is the latest agreement with the coal miners which reportedly will cost the corporation around $40 million a year.

Upward readjustment of steel prices and restoration of sufficient profit margins would possibly bring about an increase in the supply of currently hard-to-get products, it was suggested in industrial circles.

Immediately after the new one-year coal wage pact was signed by a majority of the soft coal operators and the UMW, Charles M. White, president of Republic Steel Co., Cleveland, said the pay hike has placed an unbearable burden on steel costs in relation to selling price, and indicated the probability of steel price increases. "Personally, I do not see how the price of steel can any longer be held at roughly 24 per cent above the 1936-1939 selling prices, especially when average steel wages are 93 per cent above those levels to which must now be added substantial coal wage increases," Mr. White said.

Taking a leading part in negotiating the new mine wage pact was Benjamin F. Fairless, president of United States Steel Corp. With the existence of a huge backlog of demand for steel, the corporation had a keen interest in preventing a prolonged strike of miners, with a resultant tie-up of steel production. After the mine labor agreement had been reached, Mr. Fairless said: "I am hopeful that the result will be industrial peace in the bituminous coal industry for a long time to come. This should prove to be highly beneficial to the whole economy of the nation. In my judgment, a coal strike at this time would have paralyzed the industry of the entire country."

Admitting that the new coal wage

agreement will not only raise the price of coal but also the costs of many products dependent on coal, the negotiating committee of the northern and steel-owned coal mine operators said the amount of the increased cost which will be reflected in prices will be substantially less than would have been the case if a strike had occurred and coal production stopped.

The committee said the miners' union had promised increased effort by all its members to offset the shortening of the work day and better productivity to offset the higher costs resulting from the wage increases.

Major industrial steel consumers were in agreement that any advance in steel prices will mean eventual increases in the prices of their products. Although leading automobile manufacturers were not prepared last week to say what effect higher steel prices might have on prices of their cars and trucks it was pointed out that recent price increases on Chevrolet and Ford trucks are an indication that any sizable increase in the cost of steel for cars will lead to some further upward price adjustments on the vehicles. Price increases made by most auto companies last fall, it was said, have generally been offset already by the subsequent advances in materials costs and wage rates.

Price Increases Inevitable

At Cleveland, E. J. Kulas, president of Midland Steel Products Co., a major supplier of automobile frames and other automotive parts, said a steel price increase inevitably will be passed on to the customer.

L. D. McDonald, vice president of Warner & Swasey Co., Cleveland, asserted that a steel price advance would certainly help point up future increases in the cost of machine tools for manufacturers. "The amount of steel that goes into a machine tool is not so great that it would cause any immediate action but it would be a factor in considering our overall cost picture," he declared.

C. G. Frantz, president of Apex Electrical Mfg. Co., Cleveland, commented that prices almost inevitably will have to follow costs, and that higher steel prices would be manifested in the future in higher prices for steel-fabricated products.

At Chicago, Roy C. Ingersoll, vice president of Borg-Warner Corp. and head of the corporation's Ingersoll Steel Division, said that an increase in steel prices may lead to higher prices for farm equipment parts and household appliances.

In Washington, labor experts saw inflationary dynamite in the new mine wage agreement, although they were not ready to concede that the wage boost would produce a new spiral of pay hikes throughout industry. They pointed out the major wage contracts in the nation's industries are not to come up for reconsideration until next spring.

However, economists are concerned over the psychological effect of the miners' wage boost on workers in other industries. In April, latest month for which complete figures are available, bituminous coal miners received an average weekly wage of $54.77 for 37 hours of work. During March, when they worked more hours a week they averaged about $65 a week. In January, with winter demand for coal at a peak, they earned almost $69. However, workmen in few other industries can boast similar wages.

For instance, in April when the bituminous coal miner was drawing $54.77 for 37 hours, assemblers of tractors received $53.47 and yet had to work 40 hours for it. Workers in iron ore mining were paid only $48 for 39.9 hours.

The new contract giving the UMW the sharpest major wage increase granted in American industry since the war—nearly triple the boost given earlier this year to steel, auto and other CIO unions—will push the miners further up the wage ladder, the agreement calling for a basic wage increase of $6 a week for a 40-hour, five-day week. Incidentally, the latest mine wage increase, 44½ cents an hour, is not far below the entire hourly rate of 50 cents the miners received in 1933.

The extent to which wages of bituminous coal miners have risen since the early 1930s is brought out significantly by the following comparisons of their average weekly wage:

Year	Average Wage	Year	Average Wage
1933	$14.47	1943	$41.62
1936	22.71	1945	52.25
1939	23.18	1946	58.03
1941	30.86	1947	*65.25

*Estimate, assuming 40-hour week without overtime.

First to sign the agreement were operators of the northern and steel company (captive) mines, the signers representing about 275 million tons of an annual national production of 500 million tons. It calls for increasing the basic wage to $1.63⅛ an hour. Heretofore, the miners have been getting $1.18½ an hour, with everything above seven hours drawing time and one-half. Thus, for a nine-hour day the miners have been receiving $11.85. Now they will get $13.05 for an eight-hour day, with the eighth hour at the basic rate. Overtime pay is granted for Saturdays and Sundays when they constitute the sixth and seventh work days. Holidays and any start for an hour or so on any day are used in computing the sixth and seventh days.

The new agreement also provides that: Production royalty for welfare fund is to be increased to ten cents a ton from five cents, with the miners' chieftain, John L. Lewis, as fund chairman; contract is to run until June 30, 1948, but is subject to cancellation on 30-day notice by either the union or the operators; miners are to work when "willing and able" instead of agreeing not to strike as in old contract; union will get a check-off, and a union shop as soon as the membership votes for it as provided under the Taft-Hartley law; operators are not permitted to fine miners for being absent from work; no part of the agreement may be changed without disturbing the whole contract; the federal mine safety code is extended to all mines covered by the contract; an annual vacation is provided from June 26, 1948, to July 5, 1948, when coal production shall cease; union will abstain from trying to organize mine supervisory workers; and all disputes under terms of the contract are to be settled through collective bargaining.

UMW officials stated that geographic differentials existing prior to the new pact are kept in it. All basic rates go up $1.20 a day but the differentials remain, they explained.

While it might immediately appear that John L. Lewis is pricing his miners out of jobs, such probably will not come to pass, for he is a shrewd bargainer. Nobody other than Mr. Lewis is probably more aware that supplies of natural gas and oil are far more limited in supply than coal, and that eventually the nation will have to depend even more on coal as its source of fuel, whether coal be used directly as a fuel or as a source from which to extract gas and oil.

In discussing coal as the one natural resource of which there is a big supply, W. W. Bayfield, executive secretary of the American Coal Sales Association, Washington, said recently, "it is well to take cognizance of the fact that we depleted our oil reserves shockingly during the war years . . . The expansion of natural gas pipelines will only tend to exhaust the limited quantity of that fuel that much sooner."

Folder Describes Fruehauf Fiscal Matters to Workers

Beginning a series of educational pamphlets to explain the American enterprise system to its employees, Fruehauf Trailer Co., Detroit, recently released a folder entitled "A Business Organization Is Like an Individual—Like You!"

Simplifying the mysteries of the balance sheet and profit and loss statement and interpreting it on the layman's level, the pamphlet explains company fiscal matters in terms of an individual's finances.

Industry To Spend $3.8 Billion on New Construction This Quarter

American business, exclusive of agriculture, expected to increase expenditures for new plants and equipment, according to a quarterly survey by the Department of Commerce and the Securities & Exchange Commission

AMERICAN industry and business, exclusive of agriculture, expects to spend about $3.8 billion during the third quarter of 1947 for construction of new plants and purchase of new equipment, according to a quarterly survey by the Department of Commerce and the Securities & Exchange Commission.

This amount is somewhat above the expenditures planned for the second quarter, $600 million greater than actual expenditures for the first quarter, and approximately the same as the sum spent in the last quarter of 1946. This anticipated expenditure will be at an annual rate almost 85 per cent above that expended in 1941 and more than 60 per cent higher than in 1929, the two prewar highs. Adjusting for the substantial price increases, expenditures during the third quarter would still be at a higher rate than in both those years.

Planned expenditures by manufacturing companies for the third quarter of 1947 account for 45 per cent of the total for all industry and are estimated at $1.7 billion. This amount is approximately the same as in the corresponding quarter of last year.

During the third quarter of 1947 manufacturing companies expect to spend about the same amount on new plants and equipment as in the second quarter. The same is true for mining, commercial and miscellaneous, and transportation companies other than railroads. Railroads and electric and gas utilities, on the other hand, expect to increase their capital outlays during the third quarter of this year.

The aggregate amount expended by industry on new plants and equipment during the first quarter of 1947, reports the survey, was about 8 per cent lower than had been previously anticipated. All industrial groups showed lower expenditures than had been planned. Manufacturing companies made 10 per cent smaller outlays than had been expected. For the most part, this was accounted for by the larger companies.

Texas Again Will Become Pig Iron Producing State

Texas again will become a pig iron producing state within the next few weeks.

Coke ovens at the Sheffield Steel Corp.'s plant at Houston now are being prepared for operation and the 700-ton blast furnace will be relighted shortly. This furnace operated for a time during the war.

The government-built plant at Daingerfield also is expected to start initial operations Aug. 1 when the 50-oven coke plant is lighted. The 1200-ton blast furnace is scheduled to go in Sept. 1. It is understood that the Lone Star Steel Co., operator of the plant, has set a price of $45 a ton f.o.b. for foundry iron. In addition, the government will pay a $12 subsidy for iron going into housing.

Negotiations also are under way for completion of the blast furnace and related facilities started as a wartime project at Rusk. It is estimated that $250,000 will be required to finish the plant. At the outset, the furnace would produce foundry iron and possibly switch to basic later.

First Half Ingot Output Totals 42,267,320 Tons

A record peacetime tonnage of steel ingots and steel for castings was produced in the first six months of 1947 when output totaled 42,267,320 net tons, according to the American Iron & Steel Institute.

June production of 6,952,216 net tons was slightly lower than May's output of 7,329,497 tons, reflecting the curtailment in the coal mines. June operations averaged 92.6 per cent of capacity, against 94.5 for May.

5,442,343 Tons of Steel Products Shipped in May

Total net shipments of steel products (excluding shipments to members of the industry for conversion to other finished products or for resale) were 5,442,343 tons in May and brought the total for the first five months to 25,908,836 tons, the American Iron & Steel Institute, New York, reported.

Included in the May totals were the following products, with the five-month totals also indicated: Structural shapes, 382,345 and 1,859,768; plates, 578,773 and 2,571,988; hot-rolled bars, including carbon, reinforcing and alloy, 833,558 and 3,991,911; cold-finished bars, carbon and alloy, 150,658 and 781,693; seamless pipe, 182,022 and 870,529; wire rods, 63,516 and 271,296; drawn wire, 219,708 and 1,070,473; tin and terne plate (hot dipped), 168,178 and 800,182; tin and terne plate (electrolytic), 137,109 and 592,850; hot-rolled sheets, 613,519 and 2,992,669; cold-rolled sheets, 474,171 and 2,226,447; galvanized sheets, 135,790 and 661,260; electrical and enameling sheets 50,297 and 234,472; hot-rolled strip, 150,433 and 727,585; and cold-rolled strip, 141,973 and 674,939.

PIG IRON AND FERROALLOY PRODUCTION FOR MAY AND YEAR TO DATE

Blast Furnace Capacity and Production—Net Tons

	Number of companies	Annual blast furnace capacity	Production							
			Pig Iron		Ferro manganese and spiegel		Total			
			Current month	Year to date	Current Month	Year to date	Current month	Year to date	Percent of capacity	
									Current month	Year to date
Distribution by Districts:										
Eastern	11	12,551,280	947,414	4,562,428	26,436	128,289	973,850	4,690,717	91.3	90.3
Pittsburgh-Youngstown	16	25,042,040	2,024,250	9,653,037	12,545	70,737	2,036,795	9,723,774	95.7	93.8
Cleveland-Detroit	6	6,557,500	531,763	2,540,271	-	-	531,763	2,540,271	95.4	93.6
Chicago	7	14,097,710	1,003,698	5,137,536	-	-	1,003,698	5,137,536	83.8	88.0
Southern	8	4,924,670	331,026	1,620,009	9,225	45,850	340,251	1,665,859	81.3	81.7
Western	4	2,536,000	191,345	901,065	3,429	11,297	194,774	912,362	90.4	86.9
Total	36	65,709,200	5,029,496	24,414,346	51,635	256,173	5,081,131	24,670,519	91.0	90.7

Soaring Gray Market Prices Hit West Coast Metalworking Plants

Senate steel subcommittee hears testimony in Los Angeles and Seattle regarding "gray" market operations. Situation is most acute in southern California where steel brings $400 per ton

SOARING "gray" market steel prices are forcing many West Coast small industries, unable to obtain supplies from legitimate sources, to close, the steel subcommittee of the Senate Small Business Committee learned recently after two weeks spent in hearings on the Pacific Coast.

The group was told that the situation is particularly acute in southern California where "gray" market operators are quoting prices of $400 a ton. This increase is being passed on to consumers, it was heard, with the result that household, factory and farm equipment prices have jumped as much as 33 per cent.

One witness in Los Angeles, however, testified that under the present setup it is important that the "gray" market be permitted to operate or else many more small manufacturers will be forced to stop operations. He said that his only supply was through this source because he was unable to get on any legitimate producer's books. The consensus of those testifying was that the illegitimate supplies were coming from surplus stocks of buyers who have mill allocations and are selling materials they do not need at present.

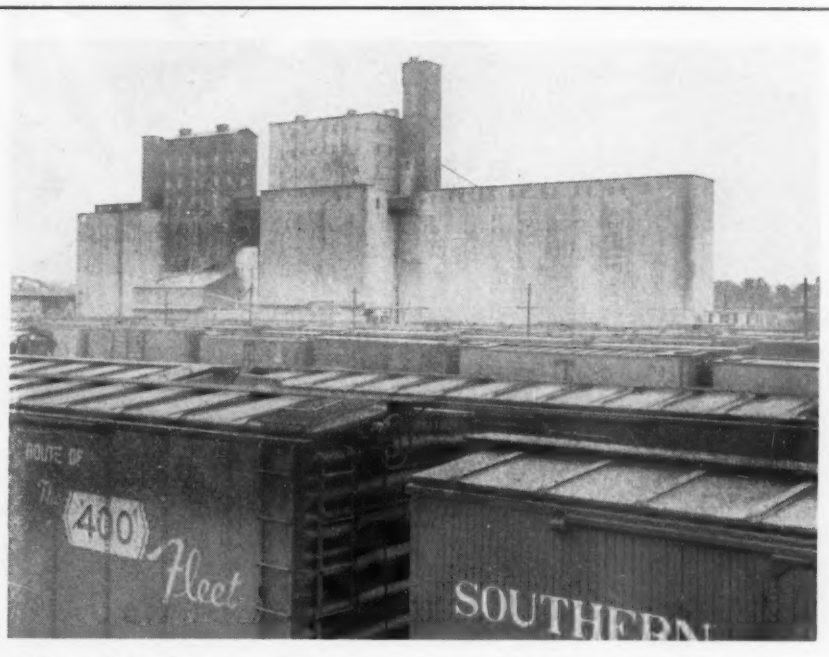
One complaint heard both in Los Angeles and later in Seattle was that quotas set by producers were based on war and sometimes even on prewar requirements.

In Seattle the subcommittee listened to testimony which indicated that there was comparatively little "gray" market activity in the area and that the shortages were induced primarily by greater industrial tempo, increased population and handicapping freight rates. In regard to this last matter, Jack Carlson, district manager of Kaiser Steel & Iron Co., told the committee that Fontana is shipping as much as possible to the Northwest, but is hamstrung by a freight rate of $14.40. As a result Los Angeles and San Francisco are absorbing most of the plant's annual 800,000-ton output, he said.

All Seattle witnesses stressed the acute shortage of sheets, indicating that many small plants face business failure in the immediate future.

Indications were that what devious market activity there was appeared to be originating chiefly from Chicago with prices quoted at $240 per ton plus freight. One witness said he had offers from Los Angeles agents at $300 to $400 per ton.

On July 9 the subcommittee resumed its Washington hearings. Included in its scope was further testimony as to need of expanded steel producing facilities, additional study of the effect of steel exports on domestic shortages, more scrutiny concerning the problems of shortages of pipe for farm and oil field use and further development of charges that the government was aggravating the steel scrap shortage through its policies on surplus tools and other materials.



BOX CAR JAM: The nation's acute boxcar shortage, now plaguing the metalworking industry, isn't helped much by this tie-up in the wheat belt. Many cars are jammed in rail yards in the two Kansas Citys as a bumper wheat crop moves in for transfer to grain elevators. NEA photo

Bureau of Mines Reports Large Utah Ore Deposits

The Bureau of Mines, in a special report on western iron ore supplies, says extensive deposits in Iron county, Utah, will be the basis of future progress of western steel plants. Development of this ore supply will hold the key to expansion of steelmaking over the long-term future, the report concludes.

These deposits are 260 miles distant from the smelters at Geneva and Ironton, Utah, operated by U. S. Steel Corp., and approximately 500 miles from the Kaiser plant at Fontana. The Colorado Fuel & Iron Co.'s plant at Pueblo, Colo., is approximately 815 miles away.

The two U. S. Steel plants in Utah consume about 3,400,000 tons of Utah ore annually and the Pueblo operation uses about 360,000 tons a year.

California Manufacturing Employment Falls by 7000

Manufacturing employment in California decreased by 7000 workers in May, compared with the April level. The employment level at 691,600 in May, however, was still above the May, 1946, total of 655,300.

The losses were accounted for by declines in the metalworking, aircraft, canning and apparel industries. Workers in the state's durable goods industries in May totaled 276,900, or 2400 less than in April, but 26,900 more than in May, 1946.

Shell Chemical To Increase Ammonia Plant Capacity

Shell Chemical Co., subsidiary of Shell Oil Co., has announced plans to expand capacity by 50 per cent at its synthetic ammonia plant in the San Francisco bay area. The plant is the largest ammonia producer in the West. The expansion program is expected to be completed in about a year.

Present German Steel Capacity Estimated Below 12 Million Tons

Proposal to raise capacity ceiling to 11 million tons in western zones would permit full operation of all remaining plants. Increased output of Ruhr works in prewar period accomplished without expansion of facilities

DUSSELDORF, GERMANY

BECAUSE the Nazis regarded actual capacity figures for the German steel industry as top secret information, relatively few people realize that steelmaking facilities in the important Ruhr area were expanded comparatively little after 1933, despite the tremendous increase in production during the '30s. The German industry was largely able to produce more steel only by improving existing equipment technologically and by operating this equipment at a reckless pace in excess of theoretical capacity.

The Nazi expansion of steel capacity took place outside of the Ruhr, mainly in the central parts of Germany, where the Flick interests expanded the plants of the Mitteldeutsche Stahlwerke and of the Maximilians-Huette. In addition, the Herrman Goering Works near Brunswick was erected, with an annual capacity of about one million tons. The Flick plants have been entirely dismantled by the Russians; the only steel plants left in the Russian zone are the Maximilians-Huette (Thuringia) and the small plants in Thale, in the Harz mountains. The Herrman Goering Works, situated in the British zone, has not as yet been permitted to resume operations.

It is difficult to determine exact steel capacity today but reliable experts within the industry estimate the "theoretical" figure for Ruhr plants at 18 million tons, not including the million-ton Reichswerke Herrman Goering.

It is improbable that war damage to the Krupp plants in Essen and Borbeck and the Dusseldorf plant of Rheinmetall Borsig can be repaired economically. If these plants are eliminated, the capacity of the steel industry, after all repairs have been carried out, will be about 17 million tons. In the first half of 1939, production reached an all-time high of 17.2 million tons on an annual basis.

In view of the fact that quite a few plants will be or have been dismantled, and that only low-grade domestic ores will be available, the total capacity of all bessemer and open-hearth steel furnaces will not exceed 10.5 to 11 million tons a year, including all plants which have been closed since the fall of 1946.

Annual capacity of plants in the American zone is rated at 400,000 tons, and those in the Russian zone at 300,000. Plants in the French zone will not exceed 300,000 tons in capacity, excluding the Saar which will most probably not belong to Germany any longer (prewar capacity of the Saar steel industry was 2.7 million tons, but was heavily damaged during the war). Total capacity for the three zones outside of the British zone will not exceed one million tons. The total capacity of all four zones does not exceed 11.5-12 million tons annually at present, unless foreign ores are admitted. If capacity ceiling is increased to 11 million tons, as has been suggested, all existing steel facilities would be operated fully.

Two additional new steel companies have been formed, in the process of breaking up the big corporations: The Georgsmarien-Huette, taking over the Kloeckner steel plants at Osnabrueck, and the Ruhrort Neiderich Huette of the Steel Trust. In 1938 the steel production of the former plant was 330,000 tons, and of the latter 1.3 million tons.

French Labor Disputes Reduce Production In Coal, Steel and Metalworking Industries

SPREADING strikes in France threaten anti-inflation efforts of the Ramadier government, and pressure for wage increases is working counter to tax plans to pay recently granted raises. Widespread strikes in France's coal mining and automobile industries broke out on June 22 as thousands of workers in plants of Citroen Motor Co. and in the coal mines of northern France walked out to join a fast-growing mass strike.

Paris bank employees began a strike

JAPANESE BICYCLES: A new industry utilizing duralumin has sprung up in postwar Japan at a Mitsubishi factory at Tsushi, Miye Prefecture. Lightweight bicycles are being turned out by the same craftsmen who used the aluminum alloy in aircraft production during the war. It is expected that most of the present production of 500 to 600 a month will be exported. NEA photo

following settlement of the railroad strike and the walkout spread all over the country; should this stoppage be of long duration, it appears likely many firms will be unable to pay employees promptly, which will add to the unrest.

Coal production in France has been declining in recent weeks, and the miners' strike is reducing output further to the extent of some 100,000 tons a day. Output of steel in June was estimated at under 350,000 metric tons, against 426,000 tons in May, owing to the railroad strike.

Although some open-hearth furnaces have been converted to fuel oil, these facilities, it is expected, will be kept for standby purposes, and conversion generally is regarded as a temporary measure. One French open hearth, however, at Toulouse, is operating on natural gas.

French purchases in the United States of miscellaneous steel products to rehabilitate the shipbuilding, railroad and steel-finishing industries are under consideration. An order has already been placed with Henry J. Kaiser Steel Co. for 150,000 tons of ship plates, and the government has approved plans for purchase in the U. S. of equipment for a continuous strip mill at Acieries du Nord and at Denain Anzin. Rolling mill and auxiliary plant will be supplied by United Engineering & Foundry Co., Pittsburgh, for $15 million, and Westinghouse Electric International Corp. will supply the electrical equipment for $6 million. The president of the French National Railroads has discussed delivery of railroad equipment with American interests, but it is possible contracts for diesel locomotives will be placed in Switzerland, Sweden or Belgium.

Belgium and Luxemburg

Part of the labor unrest prevalent in France is felt in Belgium and Luxemburg, iron and steel workers demanding a 12 per cent increase in wages. Employers, however, are resisting these demands, countering that Belgian steel prices are already higher than those of their competitors. Despite the differential, however, the export trade continues active; April iron and steel exports in fact were the highest since the war's end with 205,444 metric tons. For the first four months of the year exports were 634,613 tons, compared with 406,195 tons in the corresponding period of last year. These exports, including steel bars, structurals, plates and sheets, wire products, hoops and rails, went mainly to the Netherlands, Switzerland and Sweden. A small amount of galvanized sheets and wire nails have also been exported to the United States. By a trade agreement with Italy, Belgium will export 10,000 tons of manganese ore, 10,000 tons of steel ingots and 50,000 tons of other iron and steel products to that country.

Spotty New Machine Tool Demand Noted As WAA Begins Aggressive Sales Drive

CLEVELAND

MACHINE tool builders report extremely spotty new tool ordering, with some manufacturers able to maintain operations at a fairly steady high rate, while others are undertaking subcontract work to keep plant and labor force occupied.

There was some upsurge in demand for new tools before higher prices were put into effect last month by a number of tool builders; in many cases, however, these orders would have come in normally and would have been spread over a longer period.

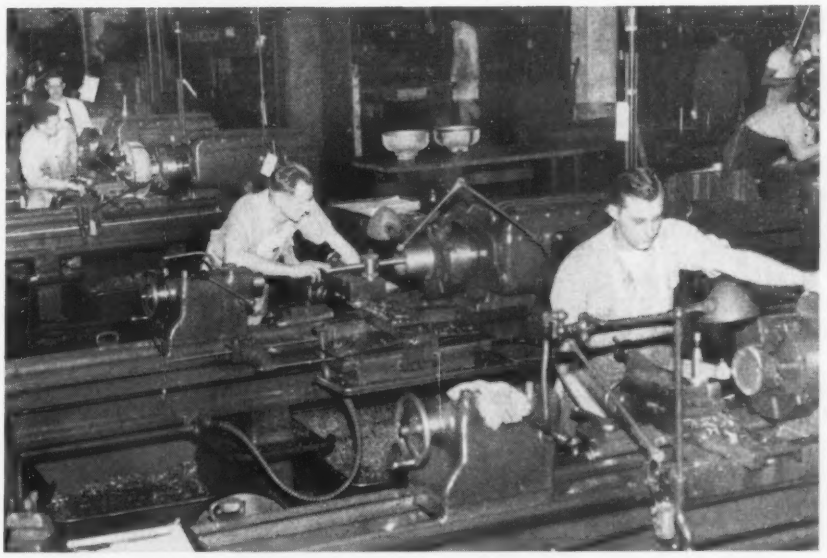
Currently it is estimated receipt of domestic orders is about $18 million monthly. Varying reports are heard on the total volume which will have been placed by the end of the year. It is expected the machine tool show at the Dodge-Chicago plant in the fall will provide a stimulus to demand; however, numerous firms are announcing new models as soon as they come into being rather than keep them under wraps for the show.

A number of Cleveland builders are doing subcontract work, several currently working on paper cutters for a local manufacturer. Layoffs of some machine tool builders' employees are occurring as it becomes increasingly evident that the industry's expanded facilities as the result of war requirements cannot be kept going at full tilt on the basis of tool building only. Even companies which added other products to their tool lines since the war are finding overhead and labor costs excessive in relation to their overall volume of business.

Contributing in some measure to declining placement of orders for new machinery is the aggressive sales campaign now under way by War Assets Administration. In the Cleveland area alone a sales target of $25 million a month for July, August and September has been projected. In a Cincinnati WAA sale, which began July 8, several hundred potential buyers looked over 3300 pieces of heavy-duty machinery, including a large proportion of machine tools, which had an original acquisition cost of approximately $25 million. This sale will continue through July 25. In the Chicago region catalogs listing three offerings of heat-treating equipment and machine tools with an acquisition cost of nearly $10 million will soon be published. Sales of these surpluses will begin on July 28 and July 30.

Date for Reciept of Tool Show Exhibits Advanced

To simplify the task of moving some $16 million worth of machine tool exhibits into the Dodge-Chicago plant for the 1947 Machine Tool Show, the National Machine Tool Builders' Association, sponsor of the mammoth exhibition, has advanced the date for receipt of displays from Aug. 25 to Aug 4.



TUCKER AUTO PARTS: Lathe hands are shown here turning out parts for the Tucker 48 in Chicago. Production plans are continuing following withdrawal of SEC objections regarding public sale of the automobile manufacturer's first block of stock. NEA photo

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

Comprehensive legislative program to aid small business seen as important part of Congress' work next year, and it is hoped RFC's extension until next June will provide aid until the full program can be enacted

LOOKING ahead, it begins to be evident that one of the major legislative programs of the 1948 session of the 80th Congress, to get into action next January, will have to do with government policies with respect to small business. To date, dissatisfaction with present policies has been expressed frequently in hearings and debates in both houses. Numerous ideas have been explored in a preliminary way, and a number of bills have gotten off to a good start. Next year, it is indicated, there will be a serious effort to map out and enact a comprehensive pattern.

As a portent may be cited the Senate approval, on July 3, of S. Con. Res. 14 which favors small business representation on government policy-making bodies. This is one of the measures still to receive House consideration. Another measure to receive further attention is S. 493, under which the government would supply technical information and services; this has been the subject of hearings by the Senate Committee on Expenditures in the Executive Departments. Another is S. 408 to amend the Federal Reserve Act so as to permit long-term capital loans to small business by Federal Reserve charter banks. Another is S. 414 under which the government would encourage small-firm participation in our foreign trade through a government insurance and financing setup.

Uncertainty Delayed RFC Extension

It was the existing uncertainty as to the full nature of the final small business program that prevented action on continuation of the Reconstruction Finance Corp. until the last minute—and then resulted in an extension only to June 30, 1948. By that date, leaders in the two Banking and Currency committees hope, rounded-out programs of a permanent character will have been enacted.

Public Law 132 which extends the RFC was written pretty largely by RFC officials and hence represents the opinions of informed insiders as to what an agency of the RFC type should be called on to do. Under this law, as signed by the President June 30, RFC continues fully authorized to make business loans, either entirely on its own or in participation with private banks. It can make loans to municipalities stricken by floods or other catastrophes. Otherwise its emergency powers have pretty largely been eliminated. The only exception is that RFC will continue authorized to liquidate materials stocks and plants and other properties accumulated under wartime powers.

The RFC is not prohibited from making foreign loans but will continue to stay out of this field except when given a special assignment by Congress—as the recent authorizations under which the RFC loaned $100 million to Greece and $75 million to the Republic of the Philippines. Otherwise problems of foreign finance will be left entirely to the reincorporated Export-Import Bank and the new world bank.

NEW DIRECTOR: George F. Kennan, former deputy director of the National War College, has been named director of the newly-created Policy Planning Staff of the State Department. NEA photo

Tin Smelter Use Extended

Another piece of stopgap legislation due for review in 1948 is Public Law 125 providing for operation of the government-owned tin smelter at Texas City, Tex., until June 30, 1949. By setting this date, congressional proponents of the law believed they were doing their part in assuring the country's tin supply until then; information developed during the hearings indicated that the tin shortage in the period immediately ahead would be most acute the latter part of 1948 and that, under increased production in various parts of the world, the shortage will have spent itself by the middle of 1949.

But there is opposition in Congress to keeping the government in the tin business. Majority sentiment calls for disposing of the Texas City smelter to private owners. Congress, however, wants assurance that the smelter, after going into private hands, will continue to be operated so as to keep production of metallic tin alive in the United States. Next year the question to be determined will concern the amount of assistance—in the form of a subsidy or of an import tariff—necessary to attract a private buyer.

The RFC's Office of Metals Reserve has extended to June 30, 1948, the contract under which the Tin Processing Corp., New York, the Billiton agent in the United States, will continue to operate the Texas City smelter for the RFC.

RFC spokesmen estimate that production of metallic tin at Texas City in 1947 will come to around 35,000 tons. At the present time about two-thirds of this tin is being produced from Bolivian concentrates and one-third from alluvial ore from the Netherlands East Indies, Siam and the Belgian Congo. In the near future production will run about 50-50 from Bolivian concentrates and alluvial ores.

By law the RFC will supply periodic reports to Congress on production, sources of raw material, conditions of supply and demand, and the cost of operating the Texas City plant.

Private Shipping on Upgrade

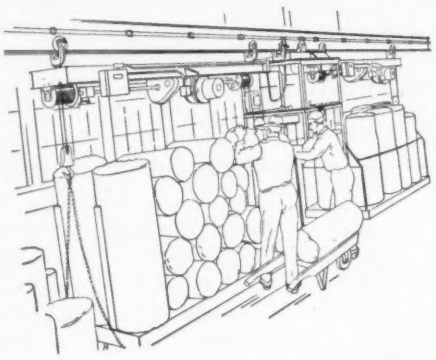
Still another stopgap act to be reviewed in 1948 is Public Law 127. This assures that there will be no interruption of the Maritime Commission's authority to operate ships in coastwise, intercoastal and overseas traffic up to March 1, 1948. In setting this early termination date, many members of Congress hoped that by that time United States shipping needs could be met by private owners. This hope was encouraged by the record of the Maritime Commission since V-J Day.

On V-J Day the Maritime Commission was operating some 5500 ships—the entire American-flag fleet. Since then 1500 bottoms have been leased to private operators under bare-boat charter. About 1500 have been placed in the reserve fleet. About 1200 have been sold. Some 200 still are being used by the Army and Navy as troopships and supply ships. Others are largely accounted for by these categories: Requisitioned ships which

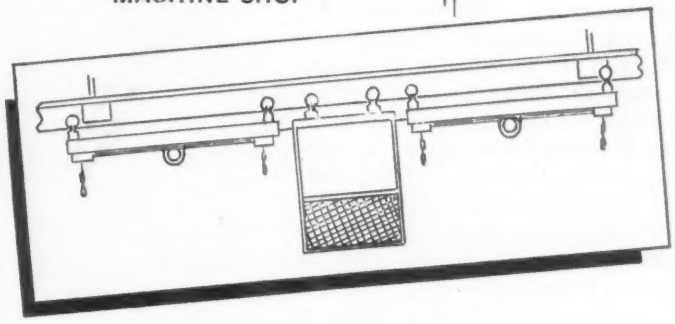
8000 lb. loads are transferred by MonoTractor Carrier to shipping platform.

SHIPPING PLATFORM

Floor trucks are lifted by hoists on MonoTractor Carrier.



MACHINE SHOP



CLOTH ROOM

Overhead Transportation with MonoTractor Drive

There are very few limitations connected with American MonoRail Overhead Handling. This installation presented at least two problems — low head room and transfer of heavy materials over large areas and from building to building. The problems were solved by American MonoRail Engineers. The equipment consists of RailMaster Shielded Track, two twin hook hoists, with cab control, propelled by an American MonoTractor.

In operation just a short time, handling costs have already shown a very substantial saving. Production has increased and manpower formerly used in lifting and hauling materials from one operation to another has been converted to more productive output.

Let an American MonoRail Engineer show you how to cut your overhead with overhead handling. This service is given without obligation.

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THE AMERICAN MONORAIL COMPANY

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have been returned to their owners, ships lost at sea, and ships still in the hands of foreign governments. Of the great wartime fleet of 5500 ships, only 343, or less than 8 per cent, still are on the Maritime Commission's operating books; of these, 211 tankers and 81 dry cargo ships are being operated by established shipping companies under GAA (general agency agreements) and the remaining 51—all tankers—are undergoing repairs.

Under the new temporary setup, wrecked and overage ships will continue as a source of scrap iron and steel. The commission now has pending sales of 22 ships containing around 140,000 tons of ferrous scrap. This is over and above the 174 ships, containing slightly more than one million tons of ferrous scrap, the commission has sold to date for scrapping.

As to one policy angle the future outlook is somewhat indefinite. That involves the disposition of the 350 tankers in our idle reserve fleet. Interested government officials, in a recent special meeting in Secretary Krug's office, advocated the sale of more of our idle tankers to foreign registry. The 76 tankers we have sold to foreign operators, it was pointed out, are hauling a lot of oil, and with more of them in operation the threat of a petroleum shortage would be minimized. However, unless the Navy Department lets down the bars, the policy calls for severe restrictions on future sales of idle tankers. It is expected the Navy will insist on keeping all idle tankers available for United States needs.

NEW STATE DEPARTMENT SECRETARIES: In ceremonies at the State Department recently Robert A. Lovett, former assistant secretary of war, was sworn in as undersecretary of state, and Norman Armour became assistant secretary of state for political affairs. Shown during the ceremonies are, left to right; Mr. Armour, George C. Marshall, Mr. Lovett and Stanley Woodward, chief of protocol, State Department, who is administering the oath. NEA photo

Belgian Congo Report Issued

The Bureau of Mines report on the mineral resources of the Belgian Congo —known as Vol. 2 No. 6 of Foreign Mineral Surveys—is possibly the last foreign mineral survey that will be published for at least a year or longer. The reason is the bureau's sharply reduced appropriation for fiscal 1948. The two men who wrote the Belgian Congo report were dismissed from the bureau's staff early in June.

The report is newsworthy also because, under an executive order by the President to the Atomic Energy Commission, no information may be divulged by any government department or agency about minerals employed in developing atomic energy. That means that the important uranium reserves of the Belgian Congo have no mention whatever in the report.

Otherwise the report is unusually complete, containing much minerals information gathered as a result of intensive exploration by American engineers and geologists during the war. As far as possible the report was laid out to assist in developing answers to the question as to what minerals the United States should import, and from what countries, in the peacetime period ahead.

The 18 reports so far issued—12 in Vol. I and 6 in Vol. II to date—cover the following areas: Peru, North Africa, Turkey, French West Africa, Italy, British West Africa, Albania, Chile, Greece, Yugoslavia, the Middle East, Bulgaria, Roumania, Hungary, Australia, Japan, Latin America and the Belgian Congo. In process is a report on the minerals of China but no date has been set for its completion.

Interest in Patents Grows

Officials of the Patent Office report a slow but steady gain in the recognition given by important patent-holding companies to the "Register of Patents Available for License or Sale." Latest large holder to list its patents is the United Shoe Machinery Corp., with 2092. Others that have listed large blocks—all the way from 400 to 5000 each are: Radio Corp. of America, New York; International Harvester Co., Chicago; Brown Co., Portland, Me.; Farnsworth Television & Radio Corp., Fort Wayne, Ind.; Nash-Kelvinator Corp., Detroit; Philco Corp., Philadelphia; Owens-Corning Fiberglas Corp., Toledo, O.

Listings of some of the smaller companies are of special interest; three patents of the Metallizing Engineering Co. Inc., Long Island City, N. Y., relating to application of spray metal to metal surfaces are among those of particular value to the metalworking industries.

Government Officials Resign

Charles B. Henderson, chairman of Reconstruction Finance Corp., and William A. M. Burden, assistant secretary of commerce, retired from government service June 30, when their resignations were accepted by President Truman. In announcing acceptance of the resignations, the President nominated Harley Hise of California for the RFC vacancy. The board of directors of the corporation will choose its chairman later.

Mr. Henderson had been RFC chairman for six years; Mr. Burden has been active in aviation work for the Commerce Department and helped develop the International Civil Aviation Organization.

Labor Act To Be Explained

The Wage & Hour and Public Contracts divisions of the Labor Department are preparing a new interpretive bulletin which will set forth policies for enforcing the Fair Labor Standards Act as affected by the new Portal-to-Portal Pay Act. Copies should be ready in the latter part of July for distribution.

Charges Fly as Congressional Group Hits Disposal Agencies

House subcommittee, investigating surplus property disposal, recommends changes in WAA personnel and policies, criticizes other government bureaus. WAA's head denies charges, holds committee was misinformed by "disgruntled employees"

WASHINGTON

ATTEMPTS to solve the vexatious problem of disposal of surplus war property appear scheduled for the January session of Congress, following recent charges and counter-charges by Rep. Ross Rizley (Rep., Okla.), chairman of the House subcommittee on expenditures, and Gen. Robert M. Littlejohn, head of the War Assets Administration.

The subcommittee, which under Chairman Rizley has been investigating surplus property disposal for some weeks, recently issued its findings, charging "confusion, inefficiency" and, in effect, a complete failure of the present surplus property disposal program. The charges were leveled at WAA, the Director of the Office of War Mobilization, the State Department, the former Civilian Production Administration, the Housing Administration and others.

In addition to its other faults, said Chairman Rizley, WAA was guilty of "misrepresentation and deception" in its reports to Congress as to progress in the disposal program. He said only the existence of his committee and the fact that it was actively investigating specific matters at the time saved WAA, and other agencies concerned with property disposal, from other "careless and stupid actions."

Sweeping Changes Necessary

"It is the firm opinion of this subcommittee that with many billion dollars worth of property yet to be disposed of, it is essential that sweeping changes be made in the War Assets Administration," said the report. "It is vital that, if the disposal of surplus property is to be accomplished efficiently and speedily, the War Assets Administration be given leadership of a civilian, rather than a military, character," the committee added, recommending that administration of further disposal be entrusted to a business man, and that key personnel be of a civilian, rather than military, background.

The committee was so critical of the use of military and naval personnel in the War Assets organization that Administrator Littlejohn, formerly a general in the Army, took note, answering that such personnel numbered only 100 in the whole organization. As to the rest of the report, General Littlejohn replied that the charge that the disposal program is unsuccessful "is not so." He also warned that if Congress follows the committee's recommendations as to legislative changes, "billions of war surplus will be relegated to a political junk yard."

The committee recommended, in part, that the President be advised that "the program for disposal of surplus war assets, as conducted by the present administrator, is unsatisfactory" but that WAA be continued in existence, after suitable amendment of the disposal act. Present priority provisions as to surplus, other than real property, would be retained, but the present 90-day option granted former owners as a priority in recovering surplus real property be reduced to 30 days.

"It is the considered opinion of the subcommittee that the history of War Assets Administration, since its inception, like the history of its predecessors, has been one of confusion, carelessness and chaos," the report added.

In detail, the report said that in connection with reimportation into this country of surplus property sold abroad "the Commissioner of War Mobilization & Reconversion and the Civilian Production Administration were guilty of inappropriate casualness and exhibited a deplorable lack of sense of responsibility. . " and further: "That the actions of various housing authorities in issuing capricious directives to the War Assets Administration arbitrarily freezing surplus property in warehouses and otherwise preventing orderly distribution of construction machinery and other property. . hampered the disposal program."

The State Department, the Office of Defense Transportation, in handling of surplus tank cars, and other agencies and individuals were specifically criticized. Particular deals in surplus disposal were also criticized.

As a result of certain of these deals, said the report, the Bureau of Internal Revenue, the Attorney General and General Accounting Office are currently making investigations of their own, at the committee's request.

Administrator Littlejohn answered the major charges of the report in a public statement, in which he said the committee had relied "for the most part on an inexperienced staff and disgruntled employees for source data."

He particularly attacked failure of this session of Congress to take action on priorities on personal property, which he said had been submitted in April, and said: "My philosophy is to sell out and get out in the interest of the common good, thereby giving the tax-payer a break."

Chairman Rizley indicated he was prepared to hold that the tax-payer would have had an even rougher ride, if the committee had not intervened.

Manufacturers' Inventories Rise $300 Million in May

Manufacturers' inventories increased $300 million in book value during May on the basis of a preliminary survey, the Department of Commerce announced. This dollar increase in inventories was somewhat smaller than in recent months, with the durable goods industries continuing to account for two-thirds of the inventory expansion.

Preliminary data indicate that manufacturers at the end of May held inventories valued at $22.4 billion, of which $11.6 billion was held by durable and $10.8 by nondurable goods industries.

All durable goods industries showed a rising trend in inventory holdings. While the average increase was about 2 to 3 per cent, the metal fabricating industries tended to expand the value of stocks to a greater degree than did the basic material producing industries.

The value of manufacturers' shipments continued to edge downward during May on the basis of preliminary data. Deliveries for the month were valued at $13.8 billion, slightly below the April volume.

The Department's index of shipments, adjusted for the number of working days, was 285 for May as compared with 287 for April and 288 for March (average month 1939 = 100).

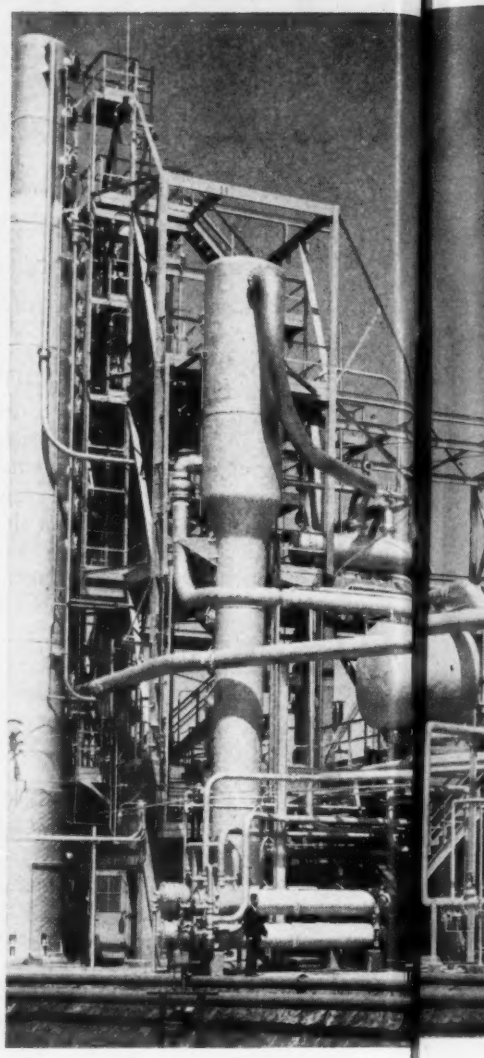
Export of Steel Plate Now Under Individual Licenses

Steel plate for export, according to announcement by the Office of International Trade, has been removed from the consolidated license procedure and now is subject to individual licenses. Applications for individual licenses may be filed at any time, and the end use of the plate will be an important factor in deciding whether the applications shall receive favorable decision. OIT warns that because of "the critical supply situation of steel plate in this country . . . . the quantity permitted for export will be very small."

New Refineries Spur Metal Products Demand

Petroleum industry expected to make capital investment of more than $1.1 billion during 1947 and 1948 for additional refining capacity. Program will require substantial volume of products of steel and metalworking companies

By VANCE BELL
Associate Editor, STEEL



SUBSTANTIAL expansion in the petroleum industry's refining facilities to keep pace with the rapidly growing demands for petroleum products is generating the need for sizable quantities of metal products.

With effective refining capacity of around 5,200,000 barrels daily and with operations currently around 5,150,000 barrels daily, the industry is having difficulty meeting all the demands for the various petroleum products, some of the consequences, due partly, however, to transportation problems, being allocations of gasoline in various areas and the refusal to accept new customers for fuel oil.

To restore the industry's traditional margin of supply over demand and to provide for the anticipated continued growth of demand for petroleum products (STEEL, July 7, p. 57), the petroleum industry is expected to make capital investments of slightly more than $1.1 billion during 1947 and 1948 for additional refining capacity and to replace old and obsolete capacity. This expenditure represents around one-fourth of the $4.1 billion the industry will make in capital investments in its four major divisions—producing, refining, transportation, and marketing.

To build the needed and highly complex refining units will require substantial amounts of tubing, piping, vessels, heat exchangers, condensers, valves, gages and instruments, compressors, pumps, and electric motors. Availability of materials and equipment will determine to a large extent the progress that will be made in bringing the petroleum industry's capacity up to date. Although costs of materials and construction have risen, in some instances sharply, the money factor does not appear to be a deterrent to accomplishment. "Give us steel, and money is a secondary consideration," says an executive of one oil company. Refining equipment to be installed includes highly complicated and specialized units such as catalytic cracking plants which have made important contributions to the yield and quality of gasoline; polymerization plants which make possible many thousands of barrels daily of high quality gasoline from refinery gases which, in the past, were wasted or burned as fuel; and alkylation units, a relatively recent development, which convert other gaseous constituents into gasoline.

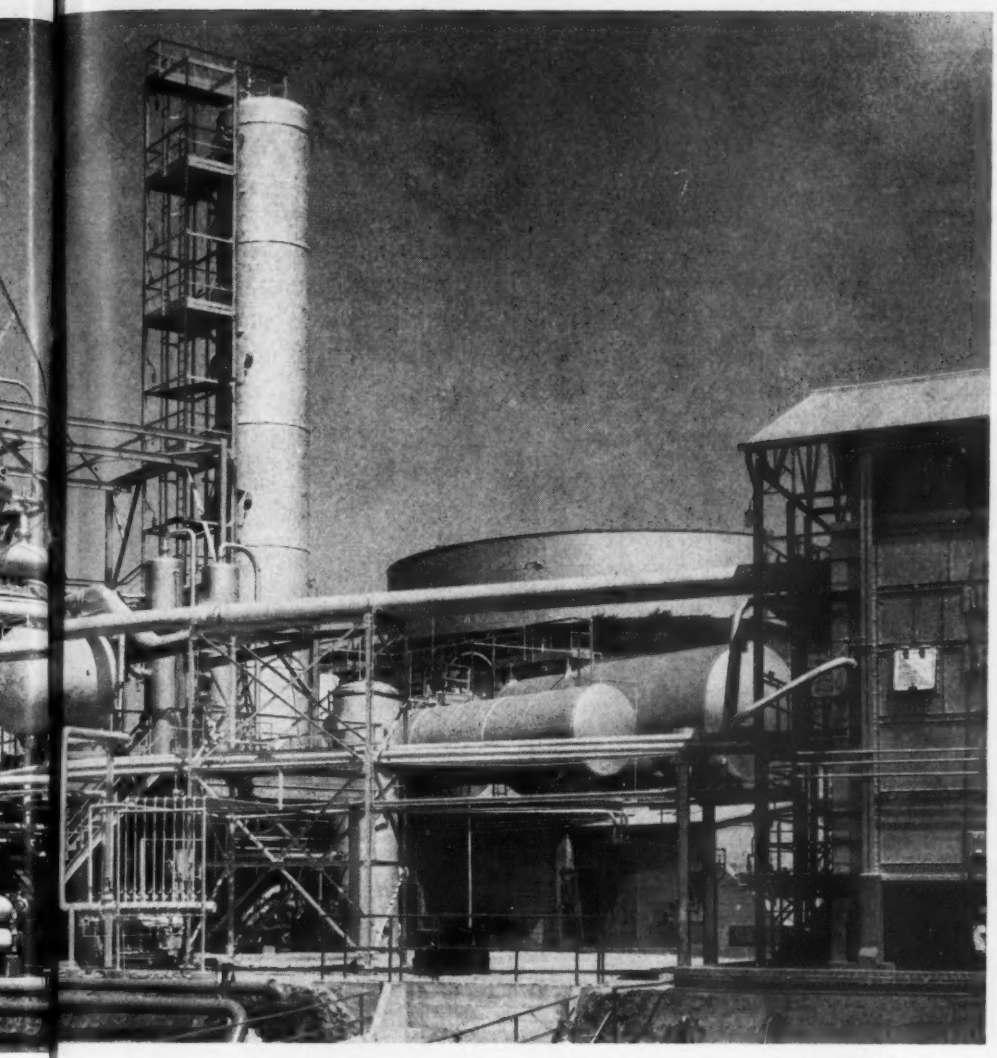
During the war, the industry made substantial capital investments in facilities for manufacture of special products needed to prosecute the war, such as high octane aviation gasoline, toluene and others, but this wartime capacity has not added appreciably to civilian production capacity, although it has made possible increases in product quality.

From the standpoint of demand, wartime peaks, which had not been expected to be reached again for several years, actually were topped in the latter part of 1946 and the upward spiral has continued into 1947. Such demand-creating factors as high employment and income levels, rapid installations of oil burners and diesel engines, widespread farm mechanization, an almost insatiable public demand for travel by automobile, together with heavy industrial and foreign demands all combine to lift the total far in excess of that which had been expected.

Compared with 1941, the current demand is even more impressive. Increases of first quarter, 1947, demand over that for the first quarter of 1941 were 21 per cent for domestic motor fuel; 155 per cent (currently about 6 per cent of production) for exports of motor fuel; 56 per cent for kerosene; and 64 per cent for gas oil and distillate.

Some of the factors responsible for the growing demand for petroleum products are: The number of domestic oil burner installations jumped from 2.4 million in 1941 to 3 million at the end of 1946, or 29 per cent; diesel electric locomotive units by class 1 railroads totaled 1331 at the end of 1941, and 4579 at the beginning of 1947, a 244 per cent increase; diesel oil consumption by all roads rose 384 per cent; fuel oil consumption by oil burning locomotives increased 22 per cent; tractors on farms increased from 1.9 million at the end of 1941 to 2.2 million on July 1, 1946, up 16 per cent; truck and truck tractor registrations were 17 per cent higher in 1946 than in 1941; passenger cars registered in 1946, although 1.3 million fewer than the 29.4 million peak of 1941, probably consume as much or more motor fuel than the 1941 total because of their much higher average age.

Despite the new equipment projected for installation, the total refining capacity won't be increased appreciably in 1947. Much of the money to be spent this year is for modernizing of equipment and to provide improved products to the consumer. The American Petroleum In-



Expansion of the petroleum industry's refineries, with their complex units such as the one pictured, creates a substantial demand for metal products. One-fourth of the industry's $4.1 billion capital investment in 1947 and 1948 is expected to go into refineries

stitute, New York, reports that refinery construction by 49 leading oil companies throughout the country during the second and third quarters of 1947 involves capacity of only 151,000 barrels a day. Of this, 85,000 barrels daily will be replacement of existing facilities.

Although refinery projects will not boost capacity immediately the outlook over a two-year period (1947-1948) is more hopeful. The American Petroleum Institute reports that a recent survey discloses that the country's refining industry, which comprises close to 500 refineries scattered throughout 36 states, has announced plans to initiate construction within those two years of 407,000 barrels-a-day of capacity. Of this total, 100,000 barrels will represent replacements of obsolete or worn-out refineries, while the remaining 307,000 barrels-a-day will represent new and additional capacity. Furthermore, announcement of other new plants is expected in the not-distant future.

The big jump in refining capacity completions is expected to come in the first quarter of 1949, the estimated addition for those three months being 134,000 barrels daily.

Meanwhile, it is necessary for the petroleum industry to push its refineries for all the production possible. In some recent weeks, refineries of the country operated at an aggregate rate of 92 per cent of capacity despite the fact approximately 2 per cent of the refining capacity was shut down by strikes and around 15 per cent was inoperative because of obsolescence or lack of sufficient crude oil. To attain a national rate of 92 per cent, it was necessary for several refineries to operate beyond their rated capacity. One very large refinery, for instance, was pushed to 140 per cent of its rated capacity.

In boosting their refining capacities through new construction, oil companies are facing costs that are about three times those of 1936 and seven times those of 1916. In bringing out this fact, L. H. Harvison, executive vice president of M. W. Kellogg Co., New York, one of the country's leading petroleum refinery engineering and construction firms, said: "Just ten years ago, the most modern refinery you could build required an investment of less than $8 per gallon of daily gasoline output. Today that investment figures in the neighborhood of $25, an increase of more than 200 per cent."

Despite difficulties in materials procurement and field erecting operations the Kellogg company was able to maintain operations fairly well during the first quarter of 1947. The company's backlog of unfilled orders as of Apr. 1 stood at a peacetime high of $105,966,000.

Another petroleum refinery engineering firm, the Foster Wheeler Corp., New York, expects its operations to expand in the second half of 1947 as a result of an increased flow of materials, notably steel. The company's production has been adversely affected by shortages of materials and a strike at its important Carteret, N. J., plant. Consequently, the company's shipments this year have been little ahead of those for the like period of last year.

Commenting on the outlook, the Arthur G. McKee & Co., Cleveland, whose engineering and contracting activities include petroleum refining plant installations, reported: "New plant construction, rehabilitation and modernization of existing plant facilities have continued at a high rate in the iron and steel and petroleum refining industries in this country since the beginning of 1947.

"This large construction program is partly due to the necessity of rebuilding and replacing operating units which became run down because they were operated at high rates of capacity during all of the war period. Some of these units have also become partially obsolete. In addition, particularly with respect to petroleum refining facilities, emphasis, during the war, was placed on equipment to make products to meet the needs of war. At the end of the war, it became necessary for the refiners to provide equipment for meeting commercial requirements," the McKee company pointed out.

Although the McKee company says there are signs that there may shortly be a leveling off in the present high rate of iron and steel plant and petroleum refining construction, it anticipates that, based on the present promising negotiations in process, it will obtain a substantial volume of new domestic work during the rest of 1947.

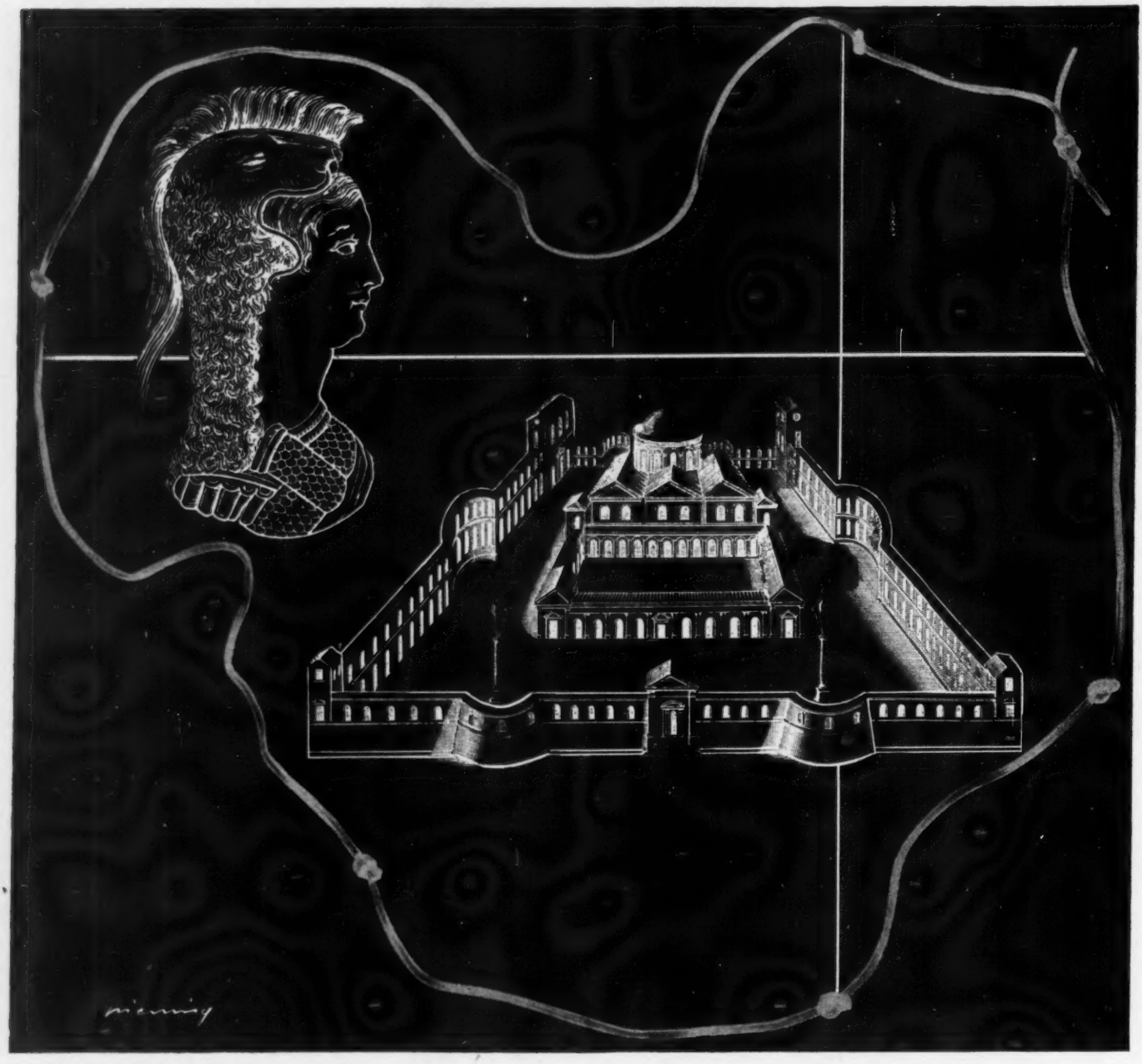
At the beginning of 1947, McKee company was hopeful that there would be a decided improvement in the supply and time of delivery of critical materials before the middle of 1947. However, the extent of the improvement has been disappointing, because, for the most part, slow deliveries of materials continue to hamper greatly the progress of the company's work.

A LITTLE DOES A LOT

According to legend, when the city of Carthage was founded, Queen Dido was told that she could have only as much land as could be encompassed by an ox hide. But the queen made the most of her material by cutting it into a single, continuous leathern string, with which she circled considerable acreage.

Making materials serve to the fullest is just as important to users of steel today as it was to Dido. Except that today no tricks are necessary.

It can be done in many instances by specifying molybdenum steels. Their hardenability, freedom from temper brittleness and good strength-weight ratio help to simplify design problems and insure good performance. It will pay you to investigate their practical advantages.



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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Production control complex job in modern automobile assembly plant. Typical Chevrolet sedan includes 3973 parts in its construction. Flow of parts and materials must be carefully co-ordinated to avoid unnecessary piling up of stock

DETROIT

COMPLEXITY of the production control job in a modern automotive assembly plant can be gaged from the fact a typical Chevrolet sedan body has some 3973 individual parts in its construction, ranging from a small washer to the large steel top stamping. Careful co-ordination of the flow of materials and parts is necessary to keep completed bodies flowing from assembly lines and to avoid unnecessary piling up of stock. To produce 50 bodies an hour, for example, as is being done at the new Chevrolet assembly plant in Flint, it is necessary to bring into the plant 200 tons of direct material a day. Bodies are produced in ten different styles, varied according to ten different color combinations, and body and color combinations are offered in five different trim combinations, adding further to the problems of production control.

In order to handle this wide variety of body and color combinations, a total of more than 2100 different items of direct material are necessary. Of these, 403 fabricated metal parts are received from other Fisher Body plants, some 380 are hardware and fittings from Ternstedt plants, 252 are trim and trim stock items from Fisher's, Ionia, Mich., plant, while better than one thousand parts are purchased from sources outside General Motors.

Body Production in Three Steps

Production of a body is divided into three major subassemblies—the floor pan or underbody assembly, the front end assembly, and the so-called "balloon" assembly which includes roof, quarter panels and rear panel. The floor pan itself is assembled from more than 100 parts. Operations include welding on gasoline tank straps, the rear compartment floor, and reinforcement strips. The completed pan is placed upon a body building truck, and is started down the conveyor line to receive the front end assembly and the balloon assembly.

Gate fixtures next are placed on the body. They are precision locating fixtures to hold subassemblies accurately while the front end and balloon assemblies are gas welded into position. Next the body moves along the line to the detail spot welding operations for welding of roof rails, back window frame, rear seat shelf, various braces and reinforcements, inner body parts, seat risers, etc. Then comes a soldering operation where welded seams are filled with solder for surfacing purposes. Soldered joints are smoothed and polished, surfaces are filed and ground to remove all uneven portions before paint is applied. Doors are hung, trunk lids attached, and the "body in white" is about ready for the finishing work of rustproofing and painting.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1947	1946
January	373,872	126,082
February	399,717	84,109
March	441,793	140,738
April	449,388	248,108
May	390,629°	247,620
June	418,557°	216,637
July	.....	331,000
August	.....	359,111
September	.....	342,969
October	.....	410,510
November	.....	380,664
December	.....	380,908
12 ms.	.....	3,268,456

° Preliminary.

Estimates for week ended:

June 21	102,545	54,475
June 28	103,203	66,913
July 5	66,537	45,155
July 12	95,000	74,015

Announces Convertible Prices

Packard has announced a Detroit delivered price of $2975 on its 1948 model 8-cylinder convertible. It will go on display in dealers' showrooms July 18 in major cities. Commenting on the price, George T. Christopher, Packard president, said the computation of the price of a brand new product under today's pattern of constantly increasing costs is a major problem for any manufacturer, the "price of newness" currently being 2½ to 3 times what it was formerly, primarily because of sharply higher costs for tooling and dies. Over $1.5 million was spent in engineering and tooling for the Packard convertible, the first such model produced by the company since 1941. August schedules call for 1000, with the output rate to be increased by fall. Plans call for introduction of another larger convertible, to be followed by standard closed body types.

Removes Paint Fumes

An innovation at the Flint plant, the first ever installed in a Fisher Body plant, is the system for removing paint fumes from the air in the spray booths. Beneath the floor grating a veritable river of water is flowing constantly, which is combined with suitable air exhausting to the point where spray gun operators do not need to wear respirators or any other similar protective equipment.

K-F Makes Profit

Kaiser-Frazer closed the second quarter of 1947 with a substantial profit and set a June production high of 12,039 passenger cars. Sales for June are estimated at approximately $22 million, comparing with $11.7 million for the entire year of 1946. June assemblies were up 16 per cent over May, and brought production for the year to 49,206.

Truck Prices Adjusted

Adjustments covering all Ford light and heavy-duty trucks have been announced, ranging from a reduction of $17 to increases of $98. Differential between V-8 and 6-cylinder truck models has been reduced from $58 to $30. No revisions have been made in passenger car prices.

4,000,000 Postwar Cars

The 4,000,000th passenger car built since postwar production began in July, 1945, rolled off some assembly line last week. In the same period of almost exactly two years, 2,200,000 motor trucks and coaches were assembled, bringing total output to 6,200,000.

To Install New Conveyor

Willys-Overland will install a new flight conveyor on its jeep and jeep truck assembly line, calculated to step up production by 25 per cent. The installation will start July 26 when the plant will be closed a week for annual inventory. Production of jeep station wagons and trucks will resume Aug. 3, but no jeeps will be built until the fol-

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Farm tractors have come a long way since Ford built its first one in 1909. *The old models above boasted copper water jackets, and its rear wheels came from a binder. Initial shipments of the new tractor, now in production at Ford's Highland Park plant, were begun last week*

lowing week. The new conveyor comprises an endless caterpillar chain which receives vehicles after body and wheels have been mounted, and propels them over a work pit 140 feet long. The pit arrangement permits workers to complete underchassis construction more quickly and easily than is possible with the conventional conveyor.

Fruehauf Expands Body Line

A new line of all steel truck bodies has been announced by Fruehauf Trailer Co., in 12, 14 and 16-ft lengths. They are available in either closed or open-top design and combination side and rear door arrangements flexible to meet special requirements. With options available, more than 500 basic combinations are possible in the line. Roofs are made up of sections of galvanized sheet with interlocking coin-pressed seams. Framing is rectangular high-tensile steel tubing. Floors feature high-tensile steel "hat" sections running the full length of the body and welded to die-formed steel cross members.

Ford Tractor Makes Debut

On July 1, the recently organized (November, 1946) Dearborn Motors Corp. formally took over national distribution of the Ford tractor, produced in the Ford Motor Co. plant at Highland Park, Mich. Manufacture and sales formerly were under direction of Harry Ferguson Inc., although closely allied with Ford operations. A new model tractor, known as the 8N, was introduced to the press last week and features a number of major improvements, although retaining the basic design of an all-purpose, light-weight tractor adaptable to a wide variety of farming conditions. Implements now in use with the Ford-Ferguson tractor will operate with the new model, and parts for all models of Ford tractors will continue to be available through Ford tractor dealers.

An improved hydraulic system and linkage attachment for implements has been developed, along with a new drawbar height control mechanism, actuated by a small lever, which permits carrying the drawbar at any desired height. A fourth forward speed has been added to the transmission, giving higher top speed and a wider range of working speeds. For operator comfort and convenience, step-plates have been added as standard equipment, and the seat has been redesigned to tilt back on a hinge, permitting the operator to drive standing up if he wishes. Radiator grille likewise has been hinged to allow easier cleaning of the radiator core.

Brake pedals have been located on the right side to permit operation of right and left brake with the right foot only, leaving the operator's left foot free to operate the clutch. Provision has been made on the center housing to mount a swinging drawbar. Automotive-type steering gear and mechanically actuated duo-servo brakes are additional changes. Overall weight has been increased approximately 200 pounds.

Reportedly there was never any formal working agreement between Ford and Ferguson, the unusual connection being on a personal basis between the late Mr. Ford and Harry Ferguson who brought the basic idea for the tractor to Detroit about eight years ago. Following the retirement of Mr. Ford and the managerial reorganization at Ford Motor Co. it was decided to conclude the arrangement with Ferguson and organize the new Dearborn Motors Corp., of which Frank R. Pierce, former sales manager of the Frigidaire Division of General Motors and later associated with Nash-Kelvinator, is president.

At one time the Ferguson organization planned to continue production of a tractor in a surplus war plant at Cleveland, and filed a statement with the SEC for permission to float a stock issue to finance the venture. Unfavorable financial weather caused a change in plans and a request has been made to the SEC to withdraw the statement. Apparently Ferguson has abandoned plans to produce a tractor in this country, although it is understood he will continue production in England for distribution there, in Europe and elsewhere.

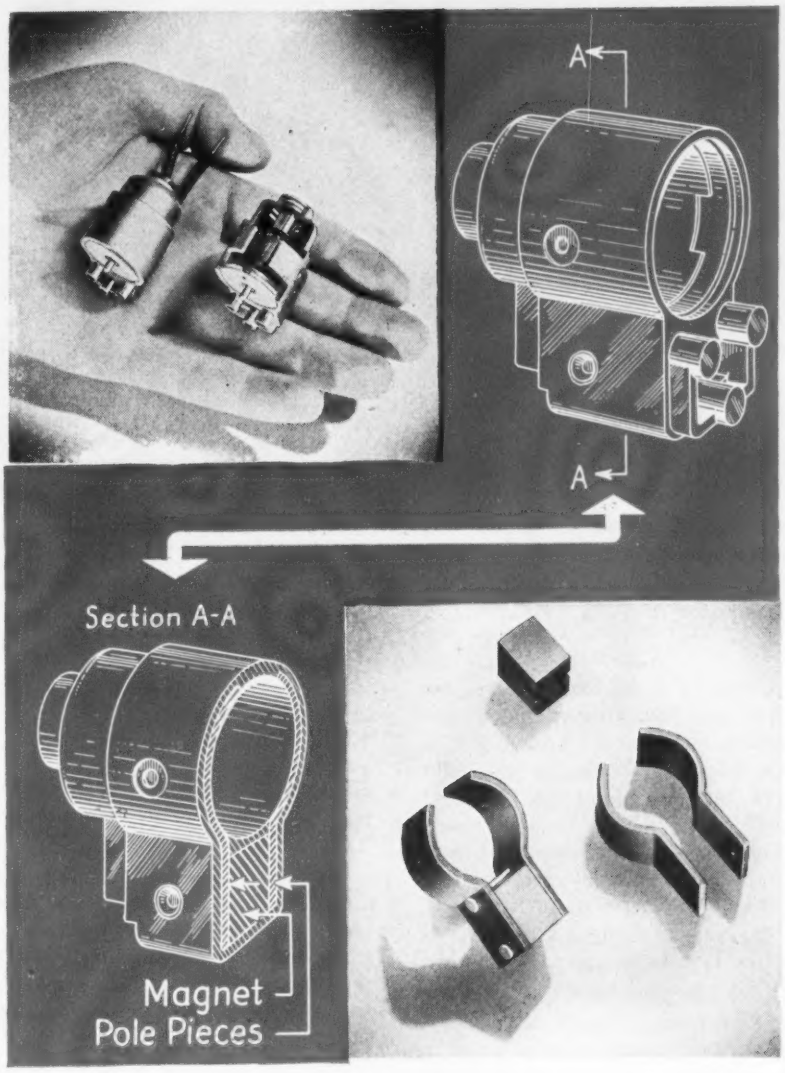
Board of directors of Dearborn Motors includes Mr. Pierce, Thomas A. Farrell, vice president; Grant Cook, legal counsel; E. C. Kanzler, chairman of Universal CIT Credit Corp.; E. R. Breech, executive vice president of Ford Motor; J. R. Davis, vice president of Ford; and Albert J. Browning, also a Ford vice president. In recent months, Pierce has named nine experts in engineering, procurement, agricultural equipment sales and sales promotion to his executive staff.

To Produce 400 Tractors Daily

The company expects to market approximately 50,000 tractors and 200,000 farm implements during the next six months. Current production schedule calls for 400 tractors daily, and initial shipments of the new tractor and implements were made last week A distinctive color scheme has been adopted—dawn gray and vermillion red for the tractor, and red for all implements.

All basic farm implements for tractor attachments are offered. They are manufactured by independent companies in accordance with designs and specifications worked out on a co-operative basis. Among the companies building implements are the Budd Co., Detroit; Southern Iron & Equipment Co., Atlanta; Pittsburgh Forgings Co., Coraopolis, Pa.; Farm Rite Implement Co., Chicago; Detroit Harvester Co., Detroit; Dellinger Mfg. Co., Lancaster, Pa.; Arps Corp., New Holstein, Wis.; American Road Equipment Co , Omaha, Nebr.; Continental Farm Equipment Co., Omaha; and Tractor Appliance Co., Minneapolis.

Tractors and equipment will be marketed through 33 distributors and 3000 dealers serving the U. S., Canada, Alaska, Hawaii, Mexico and Cuba.



INSERTS PROVIDE SPECIAL PROPERTIES

In designing die castings, keep in mind that inserts of various materials can be cast in place to obtain special properties, or to provide passages so located that they cannot be cored or cast. In addition to metals in the form of stampings, forgings or screw machine parts, commonly used insert materials in die castings are plastics, pressed paper, cloth, wood fibre and porcelain.

The above *zinc alloy* die cast housing for a vest-pocket size motor is a good example of the use of inserts to endow a casting with electrical properties (the motor is powered with a small "A" battery of the hearing aid type). Cast in place in this housing is an assembly of two steel pole pieces and an aluminum- nickel- cobalt magnet (see lower photograph). This use of inserts not only simplifies assembly of the midget motor, but the magnetic elements are accurately located and permanently anchored in the housing.

Inserts should be employed whenever their use attains results that cannot be realized at equal cost by other means. Since the positioning of inserts in a die slows the casting rate and, consequently, increases casting costs, designers will do well to determine the desirability of applying inserts after casting—in holes cored for the purpose.

ALLOY SELECTION

Equally important to the design of a die casting is the selection of the proper alloy for its production. The zinc alloys used in the die casting industry conform to specifications of the American Society for Testing Materials and the Society of Automotive Engineers (see table below). When a casting is properly designed and the alloy composition is carefully controlled with respect to every element involved, outstanding mechanical properties and dimensional stability will be assured in zinc alloy die castings.

Zamak* and Corresponding A.S.T.M. and S.A.E. Alloys

	A.S.T.M.	S.A.E.
Zamak-3	XXIII	903
Zamak-5	XXV	925

*A trade mark (registered in the U. S. Patent Office) identifying the zinc alloys developed by The New Jersey Zinc Company and used in the die casting industry.

For additional data on die casting design ask us—or your die casting source—for a copy of the booklet "Designing For Die Casting."

Send for your copy

ZINC
FOR DIE CASTING ALLOYS

The New Jersey Zinc Company, 160 Front St., New York 7, N. Y.

The Research was done, the Alloys were developed, and most Die Castings are based on

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

Apex Electric Expands Plant In Sandusky, O.

Washing machine and vacuum cleaner production lines functioning. Office moved to larger quarters

VIRTUAL completion and utilization of expanded production facilities at the Sandusky, O., plant of Apex Electrical Mfg. Co. was announced recently by C. G. Frantz, president, at the company's Cleveland headquarters.

Although finishing touches to the plant's new annex are still under way, washing machine and vacuum cleaner production lines are now functioning in the building, and the office force has been moved into larger quarters.

Production at the plant includes washing machines, fractional hp motors and vacuum cleaners. All of the company's vacuum cleaner production and electric motor manufacture was moved to the Sandusky plant after the war.

Functioning of the additional Sandusky plant facilities has resulted in an increase in product output, Mr. Frantz stated. Total employment, which averaged from 350 to 400 during the war, now totals about 1500.

Workmen above are shown performing final operations on the ¼ hp motor line at the recently expanded Sandusky, O., division of Apex Electrical Mfg. Co. Apex production of fractional hp AC motors was moved to the Sandusky plant when the company reconverted to peacetime manufacturing after the war

Chicago Industrial Outlay Totals $15 Million in June

Industrial developments amounting to $15,630,000 were announced in the Chicago area during June, bringing the total of such investments by industry for the first six months of 1947 to $89,552,000.

These developments are in the form of awarded and announced new construction, expansion of existing plants, outlays for industrial buildings and purchases of land for future expansion. According to the industrial department, Chicago Association of Commerce & Industry, the total for June, 1946, was $9,685,000, and for the first half of last year was $84,684,000.

Alcoa To Spend $2 Million To Re-equip Cleveland Plants

Aluminum Co. of America has announced a Cleveland expansion program which includes a $2 million project to re-equip its foundries and the opening of new sales quarters in Cleveland's Terminal Tower.

When revamped, the aluminum sand and permanent mold foundries are expected to rank with America's most modern jobbing foundries, Richard A. Sweet, Alcoa's district sales manager, said. He reported that Ohio and greater Cleveland now rank with the world's largest users of aluminum. Ohio alone consumed more of the metal shipped by Alcoa during 1946 than any other state in the union. The tonnage exceeded that of Pennsylvania, the next largest user, by approximately 20 per cent, he said.

The Cleveland expansion is part of a $100 million, company-wide program which is designed to increase the company's capacity for mill and fabricated products by about 20 per cent.

Former Iron and Coal Mine Manager Writes First Novel

The Touch of Human Hands is the first novel of Joseph R. Linney, author of technical and historical articles on iron and coal mining, beneficiation and the manufacture of iron and steel. After many years' experience working, operating and managing coal mines in Pennsylvania and iron mines in northern New York, Mr. Linney has retired from active management and has turned to creative writing.

The story concerns the adventures of a young mining engineer who seeks to rehabilitate a badly organized iron-mining operation in the Adirondacks. The novel portrays the social and economic conditions of a mining community just after the first war and also deals with technological problems in ore concentration confronting engineers at that time. Mr. Linney's tale affords comparison of such social and technical matters with present day difficulties.

Jersey Iron Mine Operates For First Time Since 1925

An iron mine in Ringwood, N. J., which produced ore during the days of George Washington has resumed operations for the first time in 22 years, War Assets Administration has announced.

The property, the historic Peters mine, has been leased to Ringwood Mines Inc. One of the oldest in New Jersey where iron mining first was developed in America, the mine was last worked in 1925. During the recent war, the government purchased and rehabilitated it as a reserve source of supply in case bombing should demolish the Soo locks and prevent the steady flow of Lake Superior ore to the eastern industrial area.

Technical advances in the handling of the local ore, coupled with the increasing demand for steel, make Jersey iron mining once more profitable, a WAA spokesman said.

Mexican Steelmaker Plans To Build New Coke Plant

Plans for a coke plant which will increase Mexico's coke output by 100 per cent have been announced by Altos Hornos de Mexico S.A., prominent steel producer. The news agency, Lania, reports that the facility will be built at Monclova, Coahuila, and that the Altos Hornos firm has recently almost doubled its capital stock to help finance the venture.

BRIEFS . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

Eastern Brass & Copper Co. Inc., producer of brass, bronze and other metals in sheets, strip, bars and shapes, is now occupying its new office and plant at 1122 E. 180th St., New York.

—o—

Hanson-Van Winkle-Munning Co., Matawan, N. J., manufacturer of electroplating, pickling and polishing equipment and supplies, plans to occupy its new research laboratory and test plant in Matawan by the end of the year.

—o—

Bingham Stamping Co., Toledo, O., manufacturer of brake lever assemblies and other stamping products, announces its merger with Herbrand Corp., Fremont, O., maker of standard tools and special drop forged parts. Combined operations will be conducted under the name of Bingham Stamping Co. Both the Fremont and Toledo plants will continue in operation.

—o—

North American Philips Co. Inc., New York, manufacturer of industrial and medical x-ray apparatus, has acquired a factory in Mt. Vernon, N. Y., with 60,000 sq ft of floor space, to be used for expanding operations of the company.

—o—

McCray Refrigerator Co., Kendallville, Ind., manufacturer of commercial refrigerators, has introduced a new product, the package air conditioner, a small unit designed for stores, restaurants, offices and other places which have limited floor area.

—o—

Bendix Home Appliances Inc., South Bend, Ind., has appointed the following foreign distributors: Sociedade Tecnica de Instalacoes Gerais, S.A., Sao Paulo, Brazil, to serve southern Brazil; Zigzag Corp., Guatemala City, Guatemala; and Heildverslunin Hekla Ltd., Reykjavik, Iceland.

—o—

Lupomatic Industries Inc. has been organized to take over the operations of the former Lupomatic Tumbling Machine Co. Inc. Offices and plant will remain at 4501 Bullard Ave., the Bronx, New York, and the firm will continue to make finishing and polishing equipment and supplies.

—o—

MacLean-Fogg Lock Nut Co., Chicago, manufacturer of bolts, lock nuts and floor clips, has moved to a new plant at 5535 N. Wolcott Ave. which doubles its manufacturing space.

—o—

Kinney Iron Works Inc., Los Angeles, has changed its name to Lincoln Foundry Corp. There is no change in ownership or management.

—o—

Great American Industries Inc., New York, announces that its Ward LaFrance Division, Elmira, N. Y., has purchased the Elmira plant of the former Field Force Pump Co. which was dissolved four years ago.

—o—

Howard H. Heinz Inc., Detroit, manufacturer of patented center drills, has moved to a recently purchased plant at 2525 Hilton Rd.

—o—

Spun Steel Corp., Canton, O., manufacturer of pulleys and automotive jacks, has set up a new division to develop and market spun steel products for its parent company, Automatic Products Corp., New York.

—o—

American Magnesium Corp., Cleveland, subsidiary of Aluminum Co. of America, announces that it is closing its plant on Ivanhoe Rd. in Cleveland. The plant's permanent mold facilities will be transferred to the Alcoa factory on Harvard Ave.

—o—

Reliance Electric & Engineering Co., Cleveland, manufacturer of motors, speed reducers and generators, plans to occupy its new plant in Ashtabula, O., by the end of this month. The move will free space in Reliance's Cleveland plant for new experimental and engineering departments.

—o—

Steel Service Inc., Richmond, Va., warehouse firm, is establishing a warehouse in Charlotte, N. C., which is expected to be completed in August.

—o—

Ryan Aeronautical Co., San Diego, Calif., has purchased the design and manufacturing rights of the four-place, private plane, Navion, from North American Aviation Inc., Inglewood, Calif. Ryan takes over the engineering, tooling, spare-parts program and work in process.

—o—

Adalet Mfg. Co., Cleveland, maker of bushings, cable seals and conduit fittings, has appointed Industrial Products Co., Pittsburgh, as its sales representative.

—o—

Amalgamated Steel Corp., Cleveland, has formed Malga Steel Service Division which offers engineering service in tool steel. The new division is headed by E. R. Dallas and H. E. Zecman and has opened offices at Broadway & Wire Aves., Cleveland, and 2901 Holbrook St., Detroit.

—o—

American Foundrymen's Association, Chicago, announces that its membership reached an all-time high of 9683 on July 1. The record figure represents a gain of 1144, more than 13 per cent, over the total a year earlier.

—o—

Edgcomb Steel Co., Philadelphia, warehouse firm, will establish a warehouse in Charlotte, N. C., which is expected to be ready early next year.

—o—

Sylvania Electric Products Inc., New York, manufacturer of lamps, radios and other electrical equipment, has leased an additional 6000 sq ft in Jamestown, N. Y., to house a plating department. The firm now occupies 150,000 sq ft in a building formerly used as a textile mill.

—o—

Aircooled Motors Inc., Syracuse, N. Y., announces it has been awarded an additional contract for engines, parts, tools and fixtures for the Army Air Forces amounting to over $1 million.

—o—

General Electric Co., Schenectady, N. Y., announces that its chemical department has completed a new plant in Pittsfield, Mass., for the manufacture of magnesium oxide. Occupying about 10,000 sq ft of floor area, the plant will double General Electric's capacity to produce the oxide.

—o—

Hannifin Corp., Chicago, has appointed Ridley Co., San Francisco, as its representative for the Hannifin line of hydraulic and pneumatic power and production equipment in northern California.

—o—

Maysteel Products Inc., Sheboygan, Wis., which started operations in its new plant last February, has made delivery of more than 300 refrigerated display cases since the company's organization.

—o—

B. L. McClure Co. Inc., Norwalk, O., manufacturer of finished castings for pumps, generator housings and other automotive equipment, plans to establish a plant in Escanaba, Mich. It is expected that operations will be under way by the end of next month.

—o—

Pacific Car & Foundry Co., Seattle, war operators of the government-built $2,700,000 electric steel foundry adjacent to its plant in Renton, Wash., is high bidder for leasing the facilities from WAA. The company offered a minimum monthly lease of $1,000 on a production basis of $9 to $18 per ton for various types of castings.

The Business Trend

Future Promising For Sustained High Output

A CONTINUED strong demand for consumer goods, particularly the durables, promises sustainment of industrial production in the latter half of 1947 at the high rate of the initial half of the year. This is contingent, however, on labor peace and avoidance of another round of wage increases which would send prices into a further upward spiral and further out of the reach of consumers, thus reducing consumer purchases.

In contrast to the higher level of industrial production prevailing in the first half of the year, the rate dropped sharply during the Fourth of July holiday week, which was marked by mass vacations in industry and a coal miners' work stoppage. As a result, STEEL's industrial production index for the week ended July 5 dropped 25 points from the preceding week and registered 126 per cent of the 1936-1939 average. That was the lowest level recorded since the corresponding week in 1946 when the index was also at 126.

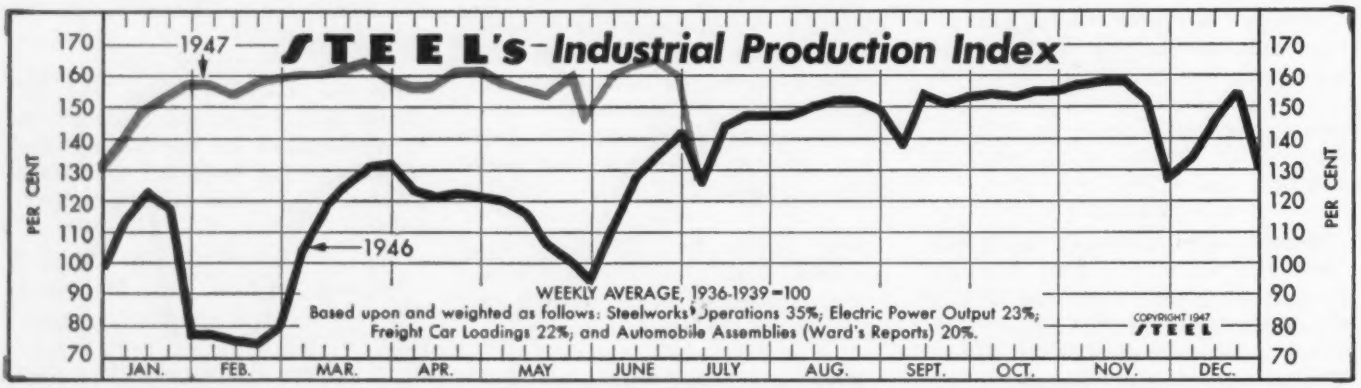
STEEL—Contributing to the sharp decline was a curtailment of steel ingot production which was at the lowest rate since early last December. However, assurance of a continued supply of fuel will be accompanied by a rapid recovery in the rate of steel output in response to the heavy pressure for steel, particularly flat-rolled products. Looming now is the likelihood of a boost in steel prices to offset the higher price steel mills must pay for fuel as a result of the recent steep wage increase to coal miners.

AUTOS—Also responsible to a large degree for the drop in the Fourth of July holiday week rate of industrial production is automobile output. Production that week of passenger cars, trucks and busses was 66,537 units, lowest since early January. In the week ended June 28, output had been 103,203 units.

PRICES—Slightly lower prices for meats and some industrial commodities brought about a decline of 0.1 per cent in the Bureau of Labor Statistics wholesale price index for the week ended June 28. This placed the index at 147.6 per cent, compared with 147.8 per cent in the preceding week.

CONSTRUCTION—Industrial building costs in the second quarter of 1947 remained at the first quarter level, the Austin Co., Cleveland, reported, attributing the stabilization to increased availability of qualified workers, improved output per man day, and a stepped up production of many building materials.

CAR LOADING—Continued high-level business activity and anticipated bumper crops are expected to push railroad freight car loadings in the third quarter of 1947 up 4.7 per cent over the corresponding period of 1946. This outlook prompted the U. S. Commerce Department to warn of a freight car shortage in late summer more serious than any yet experienced, for, the department pointed out, there are 24,000 fewer freight cars in operation today than at the beginning of 1946.



The Index (see chart above): Latest Week (preliminary) 126 Previous Week 161 Month Ago 161 Year Ago 126

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	73.0	96.5	96.5	88.0
Electric Power Distributed (million kilowatt hours)	4,150	4,675	4,635	3,741
Bituminous Coal Production (daily av.—1000 tons)	1,333	2,150	2,008	2,054
Petroleum Production (daily av.—1000 bbl.)	5,065	5,109	5,064	4,905
Construction Volume (ENR—Unit $1,000,000)	$105.6	$143.5	$121.1	$123.5
Automobile and Truck Output (Ward's—number units)	66,537	103,203	98,499	45,155

* Dates on request. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

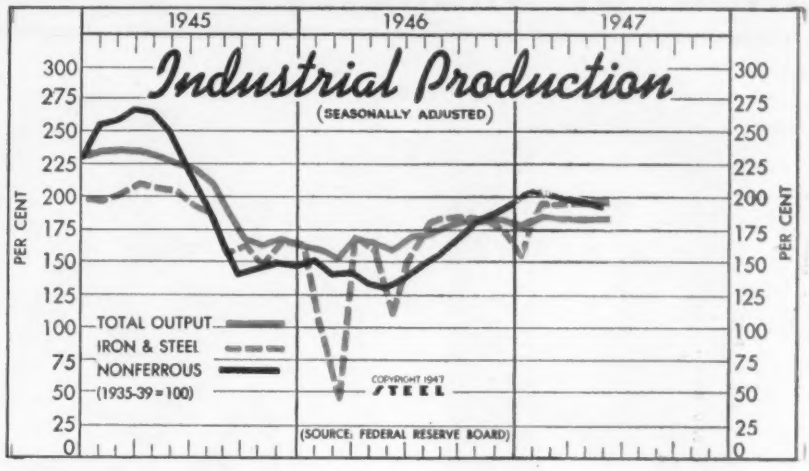
TRADE				
Freight Carloadings (unit—1000 cars)	675†	846	901	680
Business Failures (Dun & Bradstreet, number)	50†	60	66	13
Money in Circulation (in millions of dollars)‡	$28,409	$28,183	$28,261	$28,395
Department Store Sales (change from like wk. a yr. ago)‡	+2%	+3%	+12%	+38%

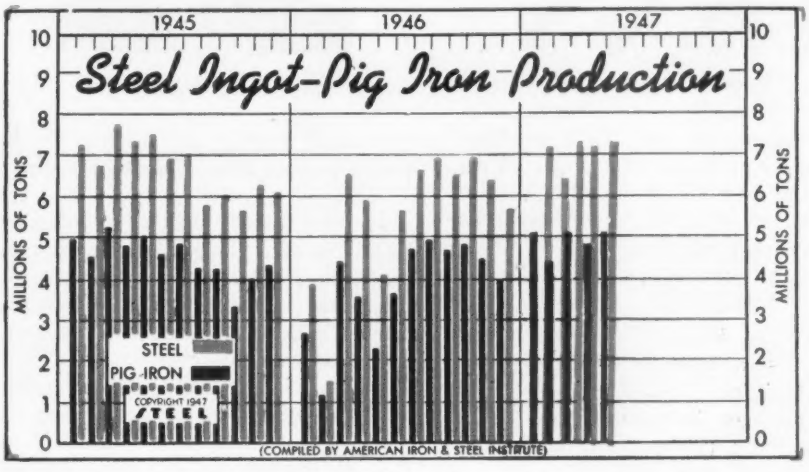
† Preliminary. ‡ Federal Reserve Board.

Federal Reserve Board's Production Indexes

(1935-39=100)

	Total Production		Iron, Steel		Nonferrous	
	1947	1946	1947	1946	1947	1946
Jan.	189	160	192	102	204	150
Feb.	189	152	191	43	204	141
Mar.	190	168	196	169	198	139
Apr.	186	165	195	159	197	132
May	186	159	197	109	193	128
June		170		154		137
July		172		180		151
Aug.		178		184		159
Sept.		180		185		172
Oct.		182		184		184
Nov.		183		178		192
Dec.		182		159		197
Ave.		171		150		157





Iron, Steel Production

(Net Tons—000 omitted)

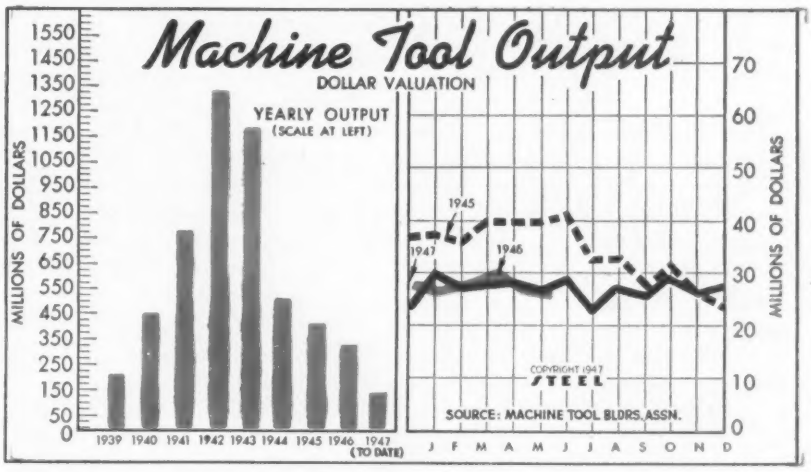
	Steel Ingots			Pig Iron	
	1947	1946	1945	1947	1946
Jan.	7,213	3,872	7,204	5,071	2,645
Feb.	6,422	1,393	6,653	4,550	1,148
Mar.	7,307	6,507	7,706	5,123	4,424
Apr.	7,043	5,860	7,290	4,830	3,614
May	7,333	4,072	7,450	5,081	2,275
June		5,625	6,841		3,682
July		6,610	6,986		4,705
Aug.		6,887	5,735		4,898
Sept.		6,518	5,982		4,687
Oct.		6,910	5,597		4,815
Nov.		6,409	6,200		4,435
Dec.		5,701	6,058		3,992
Total		66,364	79,702		*45,379

* Adjusted.

Machine Tool Shipments

(000 omitted)

	1947	1946	1945	1944
Jan.	$26,542	$30,263	$37,353	$56,363
Feb.	26,765	26,949	36,018	50,138
Mar.	29,012	27,326	40,045	51,907
Apr.	26,857	28,108	40,170	41,370
May	25,791	26,580	39,825	41,819
June		28,580	41,040	41,471
July		22,360	32,504	32,753
Aug.		26,911	32,500	35,177
Sept.		25,468	27,300	35,889
Oct.		29,140	31,200	37,516
Nov.		26,176	26,084	36,277
Dec.		27,587	23,276	36,784
Total		$325,448	$407,315	$497,464



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$13,892	$12,600	$11,296	$14,204
Federal Gross Debt (billions)	$258.4	$257.7	$257.5	$267.8
Bond Volume, NYSE (millions)	$17.2	$19.5	$13.8	$13.8
Stocks Sales, NYSE (thousands)	4,191	4,336	3,209	3,459
Loans and Investments (billions)†	$55.0	$55.1	$54.9	$61.7
United States Gov't. Obligations Held (millions)†	$34,312	$34,596	$34,479	$43,437

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$69.82	$69.82	$69.82	$64.45
All Commodities†	147.6	147.8	147.4	112.7
Industrial Raw Materials†	161.6	161.5	161.1	126.7
Manufactured Products†	142.7	142.9	142.5	107.8

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

LEO J. McPHARLIN

SIDNEY H. ROGOVIN

A. W. BAIRD

Leo J. McPharlin has been appointed assistant director of purchases for Briggs Mfg. Co., Detroit. He has been with the organization for 25 years, serving most of that time as buyer of steel and other metals used in automobile body and plumbing fixture production.

—o—

Louis O. Klingelhofer, vice president and general manager, Pittsburgh Bridge & Iron Works, Pittsburgh, has been appointed executive vice president. **Donald B. Newton,** formerly of the engineering staff of Dravo Corp., Pittsburgh, has been appointed general manager of Pittsburgh works.

—o—

John B. Wilson, secretary and assistant treasurer, Sperry Gyroscope Co. Inc., Great Neck, N. Y., has been appointed treasurer of the company and will also continue as secretary.

—o—

Fred L. Wagner has been appointed assistant sales manager, Pittsburgh district, for Universal Atlas Cement Co., U. S. Steel subsidiary. He has been with the company as sales representative for more than 25 years, serving in western Pennsylvania and West Virginia, and most recently in metropolitan Pittsburgh.

—o—

Thomas G. Hart has been appointed general sales manager, in charge of sales of steam turbines, lathe chucks, centering machines and gear cutters, for the Whiton Machine Co., New London, Conn., formerly the D. E. Whiton Machine Co. Mr. Hart had been general sales manager of the Terry Steam Turbine Co., Hartford, Conn.

—o—

Col. A. E. Higgins has been named vice president of the Rockwell International Corp., New York, subsidiary of the Rockwell Mfg. Co., Pittsburgh. He had been associated with the Rockwell organization from 1937 to 1942, leaving to re-enter the U. S. Army, which he first joined in 1915. As vice president of Rockwell International he will maintain headquarters in New York.

—o—

Sidney H. Rogovin has been named general sales manager of Tracy Mfg. Co., Pittsburgh. Until recently regional sales manager for Admiral Corp., he was formerly appliance sales manager for Stewart-Warner Corp., Chicago.

—o—

Oliver F. Gang has been elected president, director and general manager of the Ludlow Valve Mfg. Co. Inc., Troy, N. Y. He succeeds **Alfred W. Thompson,** who has been named chairman of the executive committee and continues as treasurer of the company. Mr. Gang formerly had been vice president and consulting engineer of the William Powell Co. of Cincinnati and New York.

—o—

W. C. Minsinger has been appointed industrial sales manager for the Pacific Coast branch of National Lead Co., New York. He succeeds **K. C. Specht,** who has been named assistant manager of the company's southern California division.

—o—

George F. Cronmiller Jr. has been elected secretary of Harbison-Walker Refractories Co., Pittsburgh, succeeding **P. R. Hilleman,** who is retiring after 55 years' service. Mr. Cronmiller has been associated with the company since 1913, and has been assistant secretary for the past 26 years. **Theodore Hoover Jr.** has been appointed general traffic manager, succeeding **F. M. Ewing,** who has retired after 47 years' service. **Robert R. Miller** has been appointed advertising manager, succeeding **E. B. Guenther,** retiring after service of 32 years. **E. M. Sarraf** has been appointed district sales manager in the Cleveland territory to succeed **R. P. Balph,** retiring after 41 years' service.

—o—

A. W. Baird, assistant purchasing agent, National Supply Co., Pittsburgh, has been appointed to the position of purchasing agent for the company's Spang-Chalfant Division. He has been connected with the company since 1927. **J. M. Taylor** has been appointed assistant purchasing agent of the division.

—o—

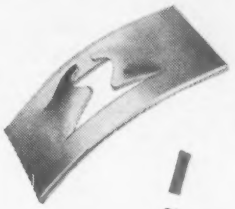
R. E. Huthsteiner, vice president and general manager, Cummins Engine Co. Inc., Columbus, Ind., has been elected a director of the company to succeed the late **Hugh T. Miller. Edwin C. Crouch** has been elected secretary to succeed the late **D. C. Bottorff. Waldo M. Harrison** succeeds Mr. Bottorff as treasurer, and will also continue as controller of the company. **H. L. Knudsen** has resigned as vice president of engineering, but will continue as a director of the company and will serve as engineering consultant on problems of design and research. The company also announces the following promotions: **D. J. Cummins** has been appointed manager of engineering and quality. He will assume most of the duties relinquished by Mr. Knudsen. **W. J. Manning** has been appointed assistant controller of the company.

—o—

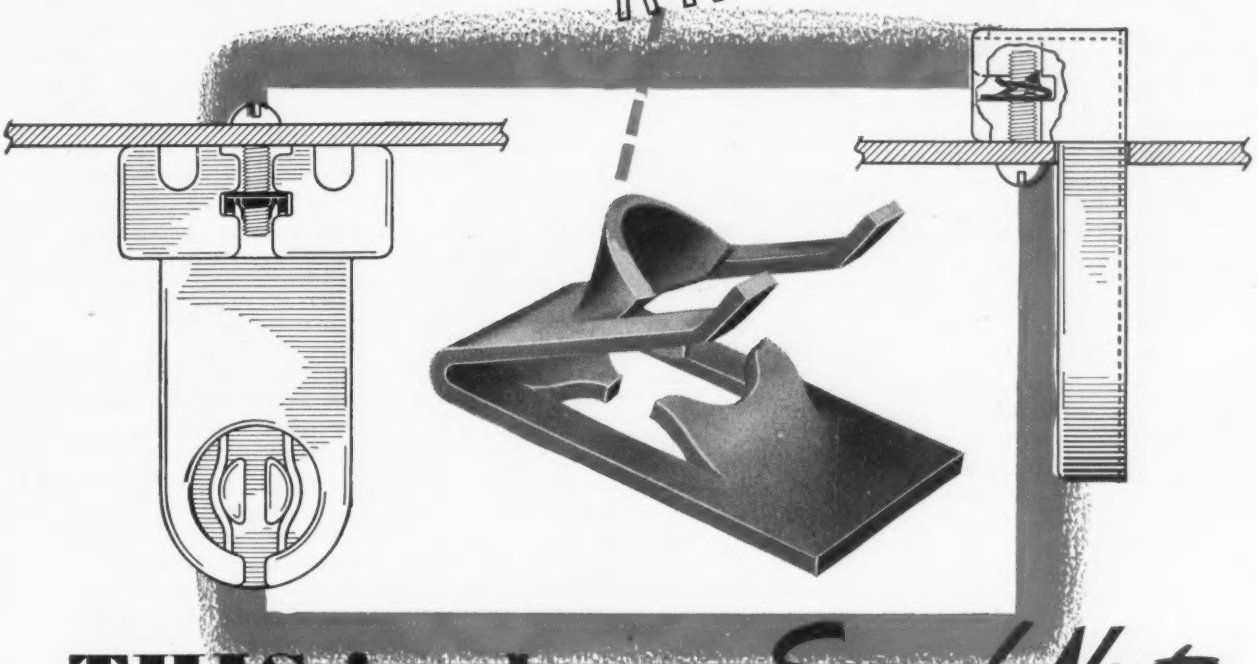
Walter F. Rockwell and **M. M. Burgess** have been elected directors of the E. W. Bliss Co., Detroit. Mr. Rockwell is president and a member of the board of directors, Timken-Detroit Axle Co., Detroit, and Mr. Burgess is president of the Scheller Mfg. Corp., Portland, Ind.

—o—

T. E. Alwyn has been appointed manager of sales for the Atlantic Division of American Can Co., New York. He succeeds **R. M. Roberts,** who has been transferred to the general sales department. **E. K. Walsh** has been named assistant

This is a  *Speed Nut*★

AND



THIS is also a *Speed Nut*

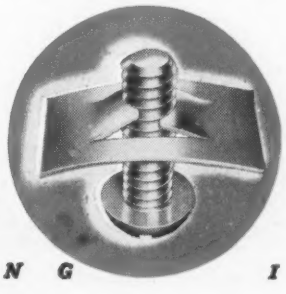
● Here is a self-retaining, self-locating and self-locking SPEED NUT designed for fluorescent tube lamp sockets. But it's merely one of hundreds of special shapes that do more than merely hold the screw.

This SPEED NUT C6800 is zipped into the recess in the lamp socket to stay. The turned up ends of the spring arms "bite" into the plastic to lock the SPEED NUT firmly in place. It is self-locating because the extruded collar butts up against the back of the vertical slot to line up the SPEED NUT impression with the screw hole. It's self-retaining and self-locking because of the exclusive spring tension lock of the SPEED NUT Brand of fasteners. Fits any socket of this type using standard 6-32 machine screws.

Why not let us design a fastener for you that can be applied **twice as fast** and do a lot of other things besides holding the screw. Write for samples or send your engineering details for a no-charge analysis.

TINNERMAN PRODUCTS, INC.
2039 FULTON ROAD, CLEVELAND 13, OHIO

In Canada: Wallace Barnes Co., Ltd., Hamilton, Ontario
In England: Simmonds Aerocessories, Ltd., London
In France: Aerocessoires Simmonds, S. A. Paris
In Australia: Simmonds Aerocessories, Pty. Ltd., Melbourne

Speed  *Nuts*★
PATENTED

★ Trade Mark Reg. U. S. Pat. Off.

MORE THAN 4000 SHAPES AND SIZES

FASTEST THING IN FASTENINGS

manager of sales; **Robert Hollister,** sales division manager; **A. C. Staley Jr.,** sales manager for metropolitan New York; and **G. W. Gryson,** assistant sales manager for the metropolitan district.

—o—

Harold C. Anderson has been elected vice president of research engineering and development of Thermoid Co., Trenton, N. J.

—o—

H. D. Worthington has been appointed supervisor, construction material sales, Chicago district, for American Steel & Wire Co., a subsidiary of U. S. Steel Corp., New York. **Banks E. Eudy** has been appointed director, stainless steel sales, Manufacturers Products Sales Division of the company. He has been connected with Carnegie-Illinois Steel Corp., another U. S. Steel subsidiary.

—o—

Harold B. Moran has been appointed steel buyer, International Harvester Co., Chicago. He succeeds **David C. Young,** who has resigned. Mr. Moran formerly had been sales representative with the Wisconsin Steel Division of International Harvester Co.

—o—

Charles H. Schniglau, assistant traffic manager, Chicago district, U. S. Steel Corp. subsidiaries, has retired after more than 45 years of continuous service. He is succeeded by **H. W. Huebner,** general supervisor, who in turn is succeeded by **G. W. Annen. E. W. Crane** succeeds Mr. Annen as supervisor, rate and route bureau, traffic department.

—o—

Changes of sales personnel of Bethlehem Steel Co., Bethlehem, Pa., are as follows: **J. M. Ellis,** general manager of sales, has been appointed assistant to vice president. **K. L. Griffith,** assistant general manager of sales, has been appointed general manager of sales. **D. C. Roscoe,** manager of sales, sheets and strip, has been appointed assistant general manager of sales. **A. T. Hunt,** manager of sales, galvanized sheets and formed products, has been appointed manager of sales, sheets and strip. **M. C. Schrader,** assistant to the general manager, has been appointed assistant to the vice president.

—o—

A. B. Nauert, assistant division sales manager, Southern Division, Columbia Steel Co., U.S. Steel Corp. subsidiary, has retired after 44 years of service with the corporation.

—o—

Frank T. Clarke has been appointed director, cold rolled strip sales, in the general sales department of American Steel & Wire Co., Cleveland, a U. S. Steel subsidiary. **Edward B. Erickson** has been named special sales representative of the general sales department in Washington, succeeding Mr. Clarke. Mr. Erickson comes to American Steel & Wire Co. from a private practice as consultant for industry with reference to governmental controls, and during the war had been chief of priorities section of the U. S. Maritime Commission.

—o—

Howard T. Saperston has been elected president of Smith-Victory Corp., Buffalo, to succeed **Mrs. Roy S. Bain.** He had been executive vice president. **John D. Jones** has been promoted to vice president and a director of the company, and also continues as comptroller. **Richard H. Wile,** attorney, has been elected secretary. **Alfred H. Sachs** continues as treasurer and a director.

—o—

Dr. George H. Young, executive assistant to the director of Mellon Institute of Industrial Research, Pittsburgh, has been promoted to an assistant directorship of the Institute.

—o—

Joseph W. Lodge has been named to the staff of Battelle Institute, Columbus, O. He will engage in research in foundry technology. Mr. Lodge had formerly been a metallurgist for the Wheeling Steel Corp., Wheeling, W. Va.

—o—

Charles S. Munson Jr. has been named assistant to the president, Vanadium Corp. of America, New York. He has been serving as assistant to the general manager of sales.

—o—

Robert O. Bullard has been named manager of the Metallurgy Division of the chemical department of General Electric Co., Schenectady, N. Y. He has been with the company since 1930.

—o—

Ralph L. Benson has been named to head the refrigeration and appliance section of the research and advance development department of Crosley Division, Avco Mfg. Corp., at Cincinnati.

—o—

Kenneth D. Sargent has been appointed as district representative in the central district for General Electric Corp., Schenectady, N. Y., in the wiring devices section.

—o—

The following appointments have been announced by Sharon Steel Corp., Sharon, Pa.: **Fred B. Quigley** has been appointed general works manager of the blast furnaces, steel works and finishing mills of the corporation at Farrell, Pa. He formerly had been general superintendent of the Farrell Works of the Carnegie-Illinois Steel Corp., and came with the Sharon Steel Corp. as works manager of the blast furnaces and steel plants when the Farrell Steel Works was acquired by Sharon in 1945. **Phillips M. Connor** has been appointed assistant general works manager of the blast furnaces, steel works and hot strip mills at Farrell; **Reese B. Jones,** appointed assistant general works manager of the finishing departments at Farrell; and **Lorenz Wilson,** appointed chief

J. M. ELLIS

K. L. GRIFFITH

FRED B. QUIGLEY

NEW HIGH IN DEEP-DRAW PRODUCTION

NEW LOW IN DEEP-DRAW COSTS

Warco 1200-ton Double Action Tie-Rod Toggle Press

OUTSTANDING FEATURES

Eccentric gear design, eliminating all crankshafts.

All gears rotate in oil bath.

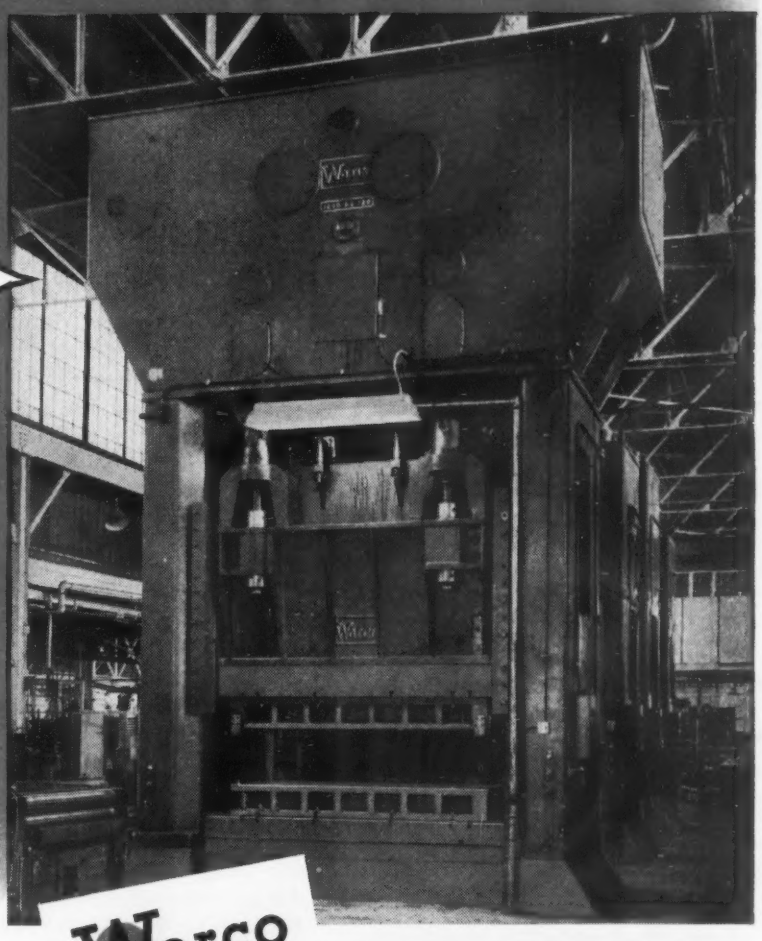
Punch holder and blank holder guided in four adjustable, bronze-lined gibs.

800-ton pressure on punch holder, 400 tons on blank holder.

Punch holder stroke 36 inches, blank holder 22 inches.

Bolster area 60 x 120 inches.

Bed equipped with WARCO 200-ton capacity, 18-inch stroke hydro-pneumatic die cushion with locking arrangement.



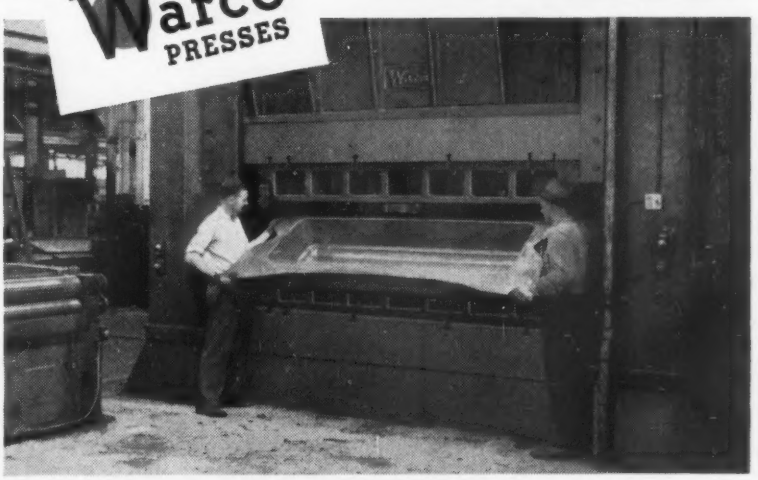
THIS rugged 1200-ton WARCO double-action toggle press makes deep, intricate draws an easy matter—and at a production rate in excess of 200 units per hour.

WARCO'S fully stress-relieved, welded-steel frame construction provides great lateral stiffness and maximum resistance to deflection even under high-production or overload conditions.

WARCO split-precision craftsmanship reduces vibration, wear and scrap loss . increases life of costly dies produces more parts per die grind.

WARCO'S skilled and experienced engineers will be pleased to help solve your press problems. Arrange a consultation today, or better still, visit our plant, the largest and most modern press plant in the world.

Warco PRESSES



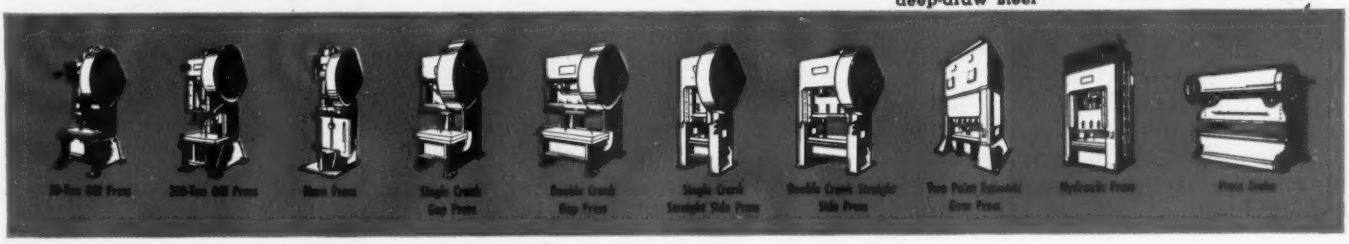
Dimensions of draw: 84 x 30 x 13 inches. Material 1/16 inch thick deep-draw steel

WARREN CITY MANUFACTURING COMPANY

477 GRISWOLD ST., WARREN, OHIO

A subsidiary of The Federal Machine and Welder Company

Offices in Principal Cities



metallurgist of the Farrell and Lowellville Works of the corporation.

—o—

H. W. Bartley has been appointed director of purchases for the National Enameling & Stamping Co., Milwaukee. He formerly had been with the American Bantam Car Co., Butler, Pa.

—o—

Lewis R. Brown, manager of the Transformer Divisions of General Electric Co., Schenectady, N. Y., has resigned after being associated with the company for 44 years. **F. J. Rudd,** managing engineer of the Motor Engineering Division of the company, has retired after 45 years' association with the division.

—o—

David T. Marvel has been appointed manager of sales, National Tube Co., in the Tubing Specialties Division, Ellwood City, Pa. He has been manager of sales in this division at Gary, Ind., and in his new position will be in charge of sales for both Gary and Ellwood City, with headquarters in the latter city. **Dale R. Mason,** formerly manager of sales, Ellwood City, has been named assistant to vice president, Tubing Specialties Division at Gary, where he will be in charge of distributor sales.

—o—

Louis J. Rohl has been appointed chief metallurgical engineer of Carnegie-Illinois Steel Corp., succeeding **E. T. Barron,** who is retiring after 42 years with this U. S. Steel Corp. subsidiary. Mr. Rohl has been assistant chief metallurgical engineer since last April, and associated with the company since 1917.

—o—

Henry W. Creeger has been appointed field engineer at Houston, Tex., for Electro Refractories & Alloys Corp., Buffalo.

—o—

George E. Dewey has been appointed general personnel director, Pittsburgh Plate Glass Co., Pittsburgh. He had been connected with the Standard Oil Co. of Indiana. **George D. McClaren,** associated with the industrial relations department of Pittsburgh Glass Co., has been appointed assistant general personnel director.

—o—

Howard F. Martin has been appointed assistant general superintendent, Aliquippa Works, Jones & Laughlin Steel Corp., Pittsburgh, and **Charles A. Kral,** assistant general superintendent, Tin Mill Division, Aliquippa Works.

—o—

J. H. Glass has been named plant manager of the Chevrolet Commercial Body Division, Indianapolis, and **James H. Wechsler** has been promoted from plant superintendent to assistant plant manager of this division of General Motors Corp. Mr. Glass, formerly master mechanic, succeeds **Earle W. Pughe,** who has resigned.

—o—

Philip G. Boyd, Washington district sales manager, Youngstown Sheet & Tube Co., Youngstown, has been appointed assistant district sales manager of the Chicago area.

—o—

Paul H. Rutherford has been named assistant general manager of the Delco Appliance Division, Rochester, N. Y., of General Motors Corp., Detroit. He has been special assistant to **B. D. Kunkle,** vice president of the corporation.

—o—

George L. Sharpe, former sales and service manager of Michigan Tool Co., Detroit, has joined the American Cutter & Engineering Corp., Warren, Mich., in a similar capacity.

—o—

Ben J. Feingold has been appointed a representative for the Max Schlossberg Co., Chicago.

—o—

Basil Fenn-Anstruther has been appointed representative in California, Nevada, and Arizona for Iron & Steel Products Inc., Chicago. He will have headquarters in Los Angeles.

—o—

E. C. Wright, former assistant to president of National Tube Co., at Pittsburgh, has been appointed professor of metallurgical engineering and head of the department of metallurgical engineering at the University of Alabama. Mr. Wright also will be engaged in consulting engineering and research work. He had been associated with National Tube 21 years, being chief metallurgist of the company's Ellwood City, Pa., plant, then chief metallurgist for the entire company, followed in 1943 by his appointment as assistant to president.

—o—

John J. Hopkins has been elected president of the Electric Boat Co., New York. He succeeds Lawrence Y. Spear, who has been appointed chairman of the board of directors of the company.

—o—

Noel Sargent, secretary of the National Association of Manufacturers for the past 14 years, has been named acting executive vice president to succeed the late **Walter B. Weisenburger.** Mr. Sargent will serve both as secretary and acting executive vice president until the latter position is filled by the National Association of Manufacturers' directors.

—o—

Col. Frank J. Atwood has been elected a vice president of Remington Rand Inc., New York. He will continue in his present capacity as director of Procurement, Inventory Control and Traffic. Col. Atwood's outstanding war time service as chief of the Rochester Ordnance District, an area covering all of New York state except the metropolitan area, won for him special citations from the War Department and the Empire Post of the Army Ordnance Association.

—o—

H. V. Johnson, sales manager, Black Diamond Coal Mining Co., Birmingham, and **E. M. Turner,** W. J. Bullock Inc., Birmingham, have been admitted to membership in the American Foundrymen's Association.

—o—

Norman F. Pinnow has been appointed chief engineer of the Henney Motor Co., Freeport, Ill. He has been associated with the company for several years, and was instrumental in designing the Pinnow collapsible seat which is used by Henney Motor Co. in all ambulances.

—o—

Fritz Bronner, export manager of Ekco Products Co., Chicago, has been elected to the new position of vice president and general manager of Ekco Products Co. Ltd., Montreal, Canada. Mr. Bronner, in addition to his duties as export manager, will direct the manufacturing and sales facilities of Ekco merchandise in Canada. He will continue to maintain headquarters in Chicago.

—o—

George Long has been named midwestern sales representative for Radiant Mfg. Corp., Chicago.

—o—

R. A. Sansing, for 30 years superintendent of the Margaret mine of Alabama Fuel & Iron Co., Birmingham, has retired.

—o—

Harvey C. Rentschler has retired as

T. KEITH GLENNAN

Formerly an executive of Ansco Division, General Aniline & Film Corp., Binghamton, N. Y., has been elected president of Case Institute of Technology, Cleveland. Noted in STEEL, June 30 issue, p. 62

P. O. PETERSON

Elected vice president in charge of manufacturing, Studebaker Corp., South Bend, Ind. Noted in STEEL, July 7 issue, p. 82

GEORGE A. CUSTER

Elected vice president in charge of manufacturing, Peninsular Grinding Wheel Co., Detroit. Noted in STEEL, July 7 issue, p. 82

GEORGE D. PENCE

Who has been named president of Wilson Foundry & Machine Co., Pontiac, Mich. Noted in STEEL, July 7 issue, p. 80

head of the lamp and electronic tube research at Bloomfield, N. J., of Westinghouse Electric Corp., Pittsburgh. He established the lamp research laboratories for the company shortly after joining Westinghouse in 1917. Mr. Rentschler is succeeded by **Dr. Charles M. Slack.**

—o—

Eldon E. Libby has joined the Southern Iron Roofing Co., Savannah, Ga., as merchandising manager of the company. He formerly had been vice president in charge of sales and promotion of the W. H. Schatz Industries Inc., Chicago.

—o—

Robert L. Stickley has been appointed as distributor promotion specialist, Carboloy Co. Inc., Detroit. He succeeds **T. D. Emerson,** who has resigned. Mr. Stickley formerly had been advertising and sales promotion manager at Progressive Welder Co., Detroit.

—o—

Ralph W. Rausch, assistant chief engineer at the Pershing Road plant of Link-Belt Co. Chicago, has been appointed chief engineer. He succeeds **C. S. Huntington,** who has retired. Mr. Rausch has been connected with the Pershing Road plant since 1927. **H. Walter Regensburger,** who has been assistant to the vice president in charge of engineering, at Chicago, since 1944, has been appointed divisional engineer in charge of estimate-engineering at the Pershing Road plant. **Eugene P. Berg,** who has served as assistant to the president since the recent death of **E. L. Berry,** vice president in charge of production, has been appointed general superintendent at the Pershing Road plant. **Joseph C. Spence,** general superintendent at the plant, has been appointed assistant to **Harold L. Hoefman,** recently appointed vice president in charge of manufacturing.

—o—

Timothy L. Sullivan has retired from the Pittsburgh plant of Federated Metals Division, American Smelting & Refining Co., New York. He has been in 52 years' continuous service at the Pittsburgh plant.

—o—

Robert O. Dehlendorf, eastern district manager of the Emerson Electric Mfg. Co., St. Louis, has joined the sales staff of Jack & Heintz Precision Industries Inc., Cleveland, as eastern district sales manager of the Electric Motor Division.

John F. Phillips has been appointed director of sales, and **Kenneth D. McLetche,** sales manager, of the Industrial Equipment Division of the Boyer Campbell Co., Detroit.

—o—

Sydney W. Taylor has been appointed general manager of the recently purchased Kaiser-Frazer Corp. foundry at Dowagiac, Mich. Mr. Taylor has been associated with the Kaiser organization since 1934.

OBITUARIES . . .

Paul W. Armstrong, 60, vice president, Mississippi Valley Structural Steel Co., Decatur, Ill., and in recent years manager of its Melrose Park, Ill., plant, died July 1 in Chicago.

John E. Gosline, 75, one of the founders of the Beloit Foundry Co., Beloit, Wis., died June 27. He had been retired since 1928.

—o—

Frank C. Oakes, 65, manager of the Bethlehem Transportation Co., Cleveland, died July 4, at his home, Shaker Heights, O.

—o—

Frank W. Borchert, 40, chief test engineer Scintilla Magneto Division, Bendix Aviation Corp., Detroit, died July 4. He organized the Scintilla Test Engineering Laboratory at Sidney, N. Y., 15 years ago.

—o—

Frank Seese, 60, retired director and treasurer of Giddings & Lewis Machine Tool Co., Fond du Lac, Wis., died June 28. He had been retired since 1944.

—o—

Clarence B. Munger, 69, retired comptroller and secretary, International Harvester Co. of Canada, died recently.

—o—

Frank J. Marmion, 55, Pittsburgh district sales manager, American Steel & Wire Co., died June 30.

—o—

Charles W. Mills, former executive of the Cleveland Electric Illuminating Co., Cleveland, died July 6. He had served as secretary, treasurer, vice president and director of the company. Mr. Mills had retired in 1942, at which time he had completed 50 years' association with the company.

—o—

Daniel H. Chason, 62, a development engineer, mechanical engineering department, Singer Mfg. Co., Elizabeth, N. J., died June 30.

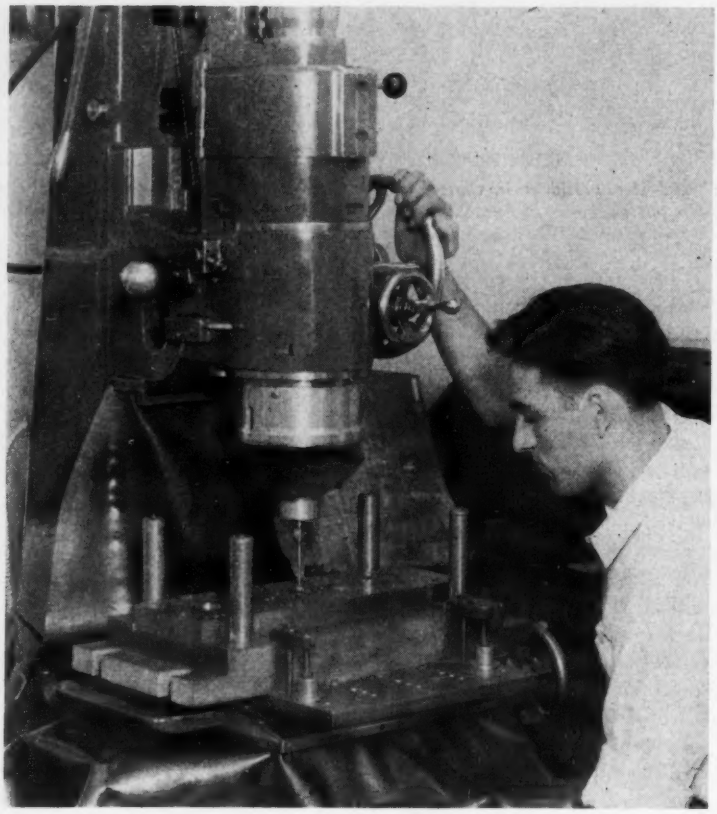
—o—

Walter Anderson, 54, assistant chief inspector, Continental Foundry & Machine Co., East Chicago, Ind., died July 2 in Chicago.

—o—

Paul C. Richter, plant superintendent, Philadelphia Division, Yale & Towne Mfg. Co., New York, died July 3. He had been with the company 42 years.

GRINDING...



Upper left—Plain hydraulic cylindrical grinder, 1½-in. diameter capacity, designed for operational convenience. "Knee hole" in bed permits operator to sit or stand. Photo courtesy Landis Tool Co.

Lower left—Precision finishing steel parts on Mattison heavy duty surface grinder equipped with magnetic chuck. Machines such as this are used extensively for finishing beds and slides of machine tools

Above—Jig grinder in action, sizing and correcting holes in die member of large "pillar" punch and die set for pattern of holes in sheet metal parts. Photo courtesy Moore Special Tool Co.

Opposite page—Finish grinding of molybdenum steel armature shaft for diesel-electric locomotive. Photo courtesy Westinghouse Electric Corp.

By GUY HUBBARD
Machine Tool Editor, STEEL

Part Six of a Series, and a Tribute to American Genius in Abrasive Development, in Engineering and in Shop Practice Which in a Brief Period of Years Has Advanced the Grinding Machine from Obscurity to Prominence Among

MODERN MACHINE TOOLS

NOT so many years ago certain makers of precision grinding machinery ran into difficulty when they applied for membership in the National Machine Tool Builders' Association. That Association, which was organized in 1902, had established as its fundamental requirement that any company—to be eligible—must be a bona fide manufacturer of machine tools, which were defined as "power-driven machines, not portable by hand, which function by removing metal progressively *in the form of chips*".

The "cutting tool minded" gentlemen who held sway in the Association back in those days did not believe that grinding machines lived up to that definition—hence were not machine tools. However, to the well informed, literal minded grinding machinery men, such reasoning made no more sense than did that of the medieval "schoolmen" as to how many angels could roost on the point of a needle.

With the aid of a microscope, they finally won their argument with the forces of conservatism. They proved conclusively that the abrasive grains in a grinding wheel are true cutting tools and that the metal removed by them actually is in the form of chips. Q.E.D: Precision grinding machines are machine tools!

Yes, precision grinding machines certainly are machine tools, as is proved beyond the shadow of a doubt by the standing which they and their builders now have in the large and progressive National Machine Tool Builders' Association in this year of 1947. Of its 190 company members, 66 build grinding machinery at least as a part of their lines. Of those 66 companies, 25 specialize on grinding machinery as their major activity.

In 1902 the founders of the Association did not foresee any such trend. In view of that, certain other trends in metalworking, just now becoming apparent, should not be underestimated as far as their possible future effects are concerned. It may be "later than we think" in some cases.

Since the beginning of time, nature has been reshaping the face of the earth by abrasive machining methods—including wind and water-borne particles of sand, boulders in moving glaciers, sliding rocks on mountain sides, and moving stones in the beds of swift streams. Among the earliest tools of primitive man were "rubbing blocks" of hard, abrasive stone used to dress down other hard, tough materials. Similar "rubbing blocks" still are used today in dressing down castings—including beds and frames of machine tools. A slightly refined version is the ever present whetstone or oilstone.

However, all those things have to do with free hand grinding. This article is about precision grinding—by

Among the $16,000,000 worth of modern machine tools on exhibition at the Dodge-Chicago plant, September 17-26, 1947, there will be a larger number and wider variety of grinders than at any show in machine tool history.

This is understandable in view of the facts that of the 190 members of the National Machine Tool Builders' Association, 66 now build grinders of one kind or another, and of those 66 companies, 25 specialize on grinders.

Abrasive machining is one of the fastest developing techniques in the metalworking field. Catch up with it at the Big Show in Chicago!

which I mean that done under positive mechanical guidance and control. That brings us right down to comparatively modern times—even though the good old revolving circular "grindstone" which is at the root of it all is an ancient invention.

The first precision grinding worthy of the name seems to have been done in textile machinery shops in the 1850s. An old workman who served his apprenticeship in the Amoskeag shops in Manchester in the early 1850s once told me that hardened steel spindles were being finished there by grinding back in those days. Natural sandstone wheels were tried, but better results were attained with shark's skin wheels "set up" on the periphery with pulverized emery and glue. Those, incidentally, were the original so-called "emery wheels."

The grinding was done in lathes, the wheel being mounted in a fixture on the carriage and belt-driven from a long wooden drum overhead. Work either was held in a chuck or between centers. I can remember seeing a Robbins & Lawrence lathe rigged up in that manner for grinding long shear blades as well as cylindrical work. That was the first "precision grinder" I ever saw.

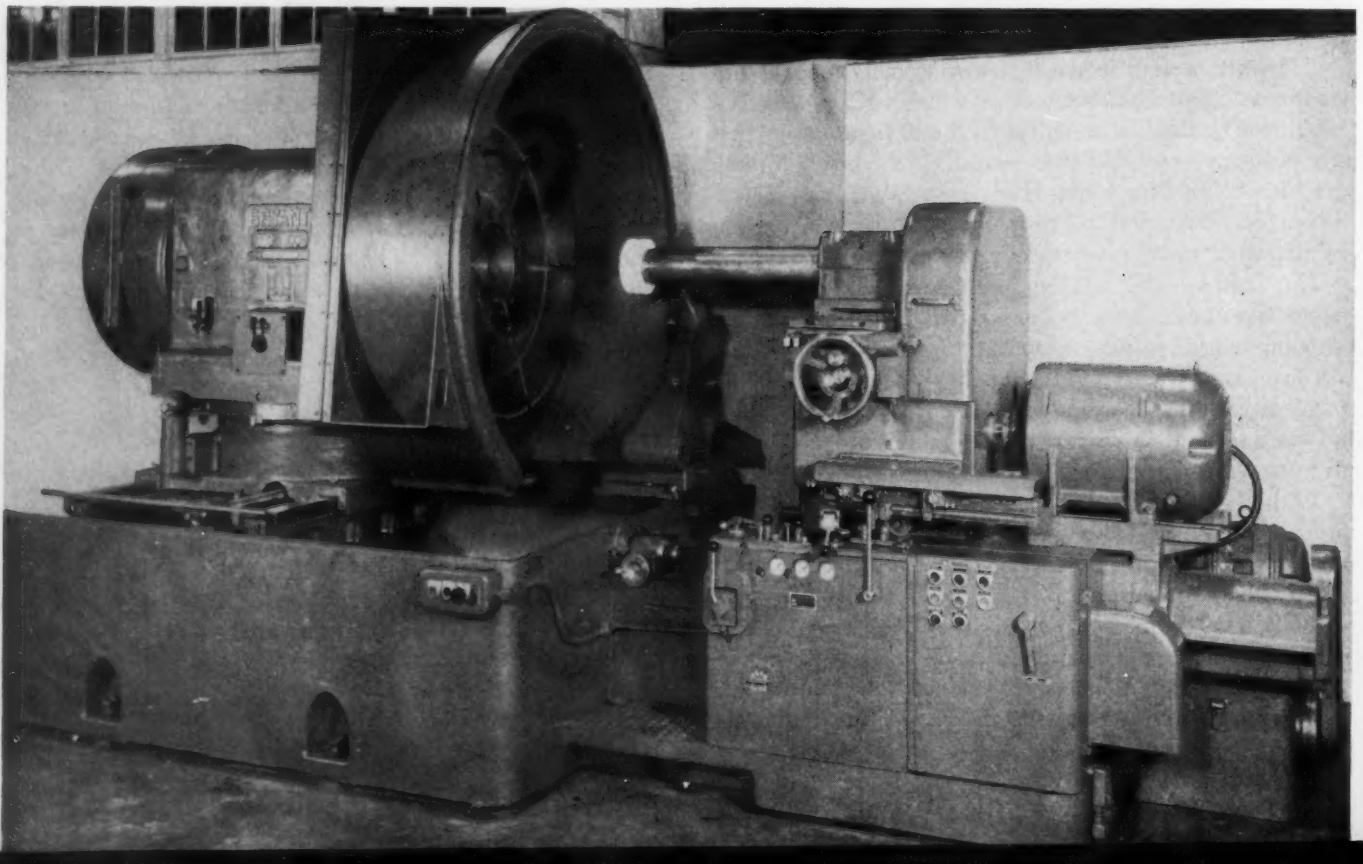
The grinding lathe did not make much headway until the invention of the artificially bonded emery wheel about 1864. Some of the oldtimers in Worcester told me some years ago that the invention came about as a result of an informal afterworking hours "discussion group" session of pottery workers and machinists—presumably over pots of ale. The question of the hour was: "What kind of a wheel would result if clay and pulverized emery were blended together, molded and fired in a kiln?" The obvious way to find out was to try the experiment, and so—according to the story—the vitrified grinding wheel was born.

Be that as it may, it is a fact that the familiar terms "cup wheels," "saucer wheels" and "dish wheels" prove the pottery ancestry of modern grinding wheels. Nor would it be the first time that an important machine tool invention has been "picked out of the air" after hours under highly informal conditions. I have been around when things like that happened. Fortunately there never have been any hourly restrictions on creative thinking in the machine tool industry.

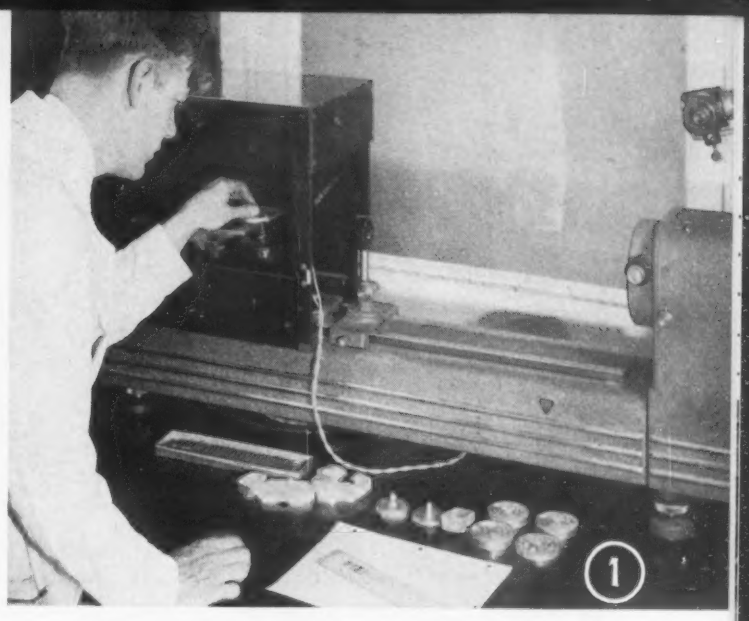
Although as has been pointed out in previous articles, a number of general machine tools have been of British origin, the precision grinding machine—like the universal miller—is an out-and-out American invention. In the form of the universal cylindrical grinding machine, it dates back directly to the "grinding lathe" built by Brown and Sharpe at Providence, R. I., in the early 1860s.

First used to finish the needle bars and foot bars of Wilcox & Gibbs sewing machines (still manufactured by Brown & Sharpe) these machines were originally put on the market about 1865. Joseph R. Brown spent much time during the last 10 years (*Please turn to Page* 116)

Internal grinding has traveled far from its early application to plug gages, to this machine which swings 60 in. and grinds holes 14 in. deep. Photo courtesy Bryant Chucking Grinder Co.



By PHILIP H. BROTZMAN
and
HERMAN E. HEMKER
Parker Appliance Co.
Cleveland



ECONOMIC METHOD OF ADAPTING

Basic Spectrographic Equipment

TO PRECISION QUANTITATIVE ANALYSIS

ADAPTATION of minimum spectrographic equipment to high speed, high accuracy quantitative determination was accomplished at Parker Appliance Co. during the war years when a large volume of such analyses were required in the acceptance inspection of forged and cast aluminum alloy aircraft parts. The equipment and technique developed continue to serve usefully by speeding laboratory work in peacetime operations, as well.

Spectrographic quantitative analysis is, of course, in itself nothing new, having been practiced for a number of years. Use of the method has been limited, however, by the refined and expensive equipment necessary to produce satisfactory results. Our project involved broadening the scope of existing laboratory equipment which in conventional practice could not be expected to produce the precise results required.

Essentially, the method of quantitative spectrography involves the burning of test material in an arc, which furnishes a light source for dispersion in the spectrograph. The characteristic lines produced are then recorded on a photographic film under closely controlled conditions. The densities of selected lines are compared with known standards, by photoelectric cell measurement, to determine the quantities of the alloying constituents that are present.

First requirement of the process is a stable, compact arc which will produce a consistent light source of sufficient duration for a photographic exposure. Flickering of the arc will alter the total density recorded by the emulsion, and so vitiate the results obtained. A scattered, flaring arc is also undesirable, (*Please turn to Page* 118)

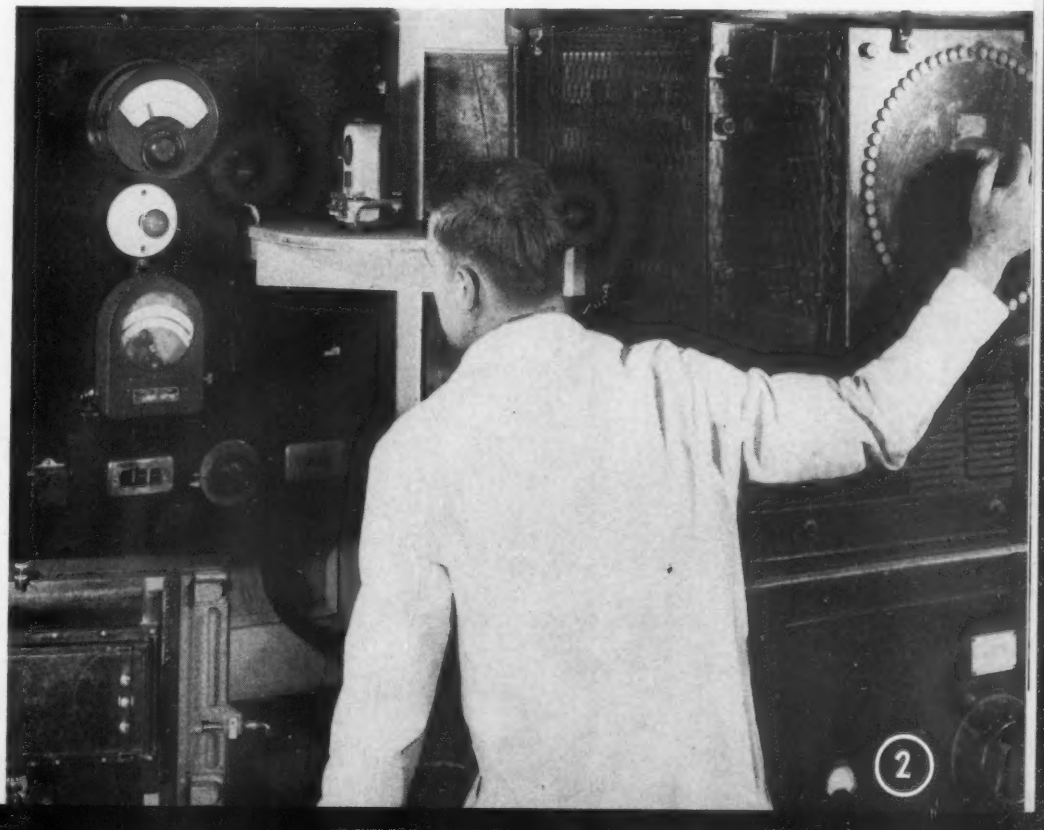


Fig. 1 — Magnetic stabilizer can be seen below pointed tip of carbon electrode. A fresh electrode is used for each arc, and control spectra from standard disks (right foreground) are included on each plate

Fig. 2—Improved arcing makes possible use of comparatively simple power equipment, integrated with regular laboratory supply system. Upper rheostat regulates alternating current flow to arc; lower handle and meter to its left control direct-current voltage applied to stabilizer coil

By GEORGE F. APPLEGATE
Ajax Electrothermic Corp.
Trenton, N. J.

Planning the Forge

. . . for high-frequency heating

STUDY of several recently designed forge shops using high-frequency induction furnaces for heating bars and billets, brings to light many savings in the handling of materials, automatic timing of the forging operation, and smooth flow of production—advantages quite apart from the usually accepted advantages of speed, lack of scale, and accuracy of induction heating—advantages that should be given careful consideration in planning the forge shop.

In good forge shop layouts, heaters are spotted next to the forging or upsetting machine. They are equipped with automatic timing, loading, and power control devices. They are paced to the maximum production capacity of the forging machines, so billets are delivered in a continuous stream, each with split-second timing and exact temperature.

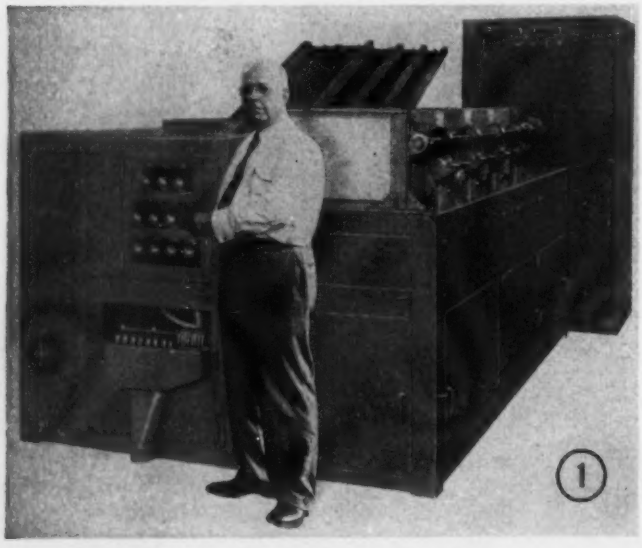
Briefly, the principal advantages of high-frequency induction heating for forging are:

Speed: 20,000 heated bar ends per day in one plant. A 2⅜ in. billet delivered at 2250°F every 28 sec by one set of heaters in another plant.

Negligible Scale: The piece is heated so rapidly there is little time for scale to form. This results in longer die life, cleaner work, greater dimensional accuracy, and little wasted material.

Economical: No heat is wasted, because the heat is generated right in the billet. Heating coils are insulated to keep radiated heat loss to a minimum.

Heating Efficiency Is High: Current consumption is reported at less than 0.20 kw-hr overall *per pound of steel heated* to 2250°F. In most forging operations, only that part of the billet to be worked is heated when induction heaters are used, hence this current consumption shows a remarkably low current cost per piece.



Modern induction heating is a far cry from the charcoal-fired open forge of the old smithy's shop. It meets all demands of today's high-speed, low-unit-cost production lines

Higher Production Rates: This is made possible with forging or upsetting machine, because of accurate temperature control and clean dies, and because there's always a billet ready when it's needed.

Clean, Close-Tolerance Work: Achieved with fewer passes, minimizes subsequent machining and finishing operations.

Easily Convertible: The heating coil itself is relatively simple and can be changed or readapted quickly at little cost for a changeover from one job to another.

Comfort: There is little smoke, fumes, or radiated heat to fatigue workers.

Desirable Load: Load on public utility system results from unity or near-unity power-factor at which the high-frequency motor-generator unit operates.

Differential or "Pattern" Heating: It is possible to make certain sections of the billet hotter than others, with any temperature gradient or "pattern" desired for best flow of metal in the dies. This is achieved by designing the heating coil with proper spacing, correct setting of taps, and correlating factors of speed, power, and frequency.

The high-frequency heating equipment consists of two main parts: The work station, including the heating coils with all necessary timers, controls, work holding devices, conveyors, etc. required; and the high-frequency power source, usually a motor-generator set for medium and heavy heating, together with capacitors, control panel, ventilating system, etc.

In planning the forging shop for induction heating, greatest economies can be achieved by careful design of the heating coil and work station to minimize handling, provide accurate temperature and speed control, and conserve shop space.

Average modern forging heater consists of the inductor coil or coils mounted vertically, horizontally, or at an angle in the most convenient position on an attractive sheet steel cubicle. Controls at the heater usually consist only of push-button station, meters and signal lights.

Shop

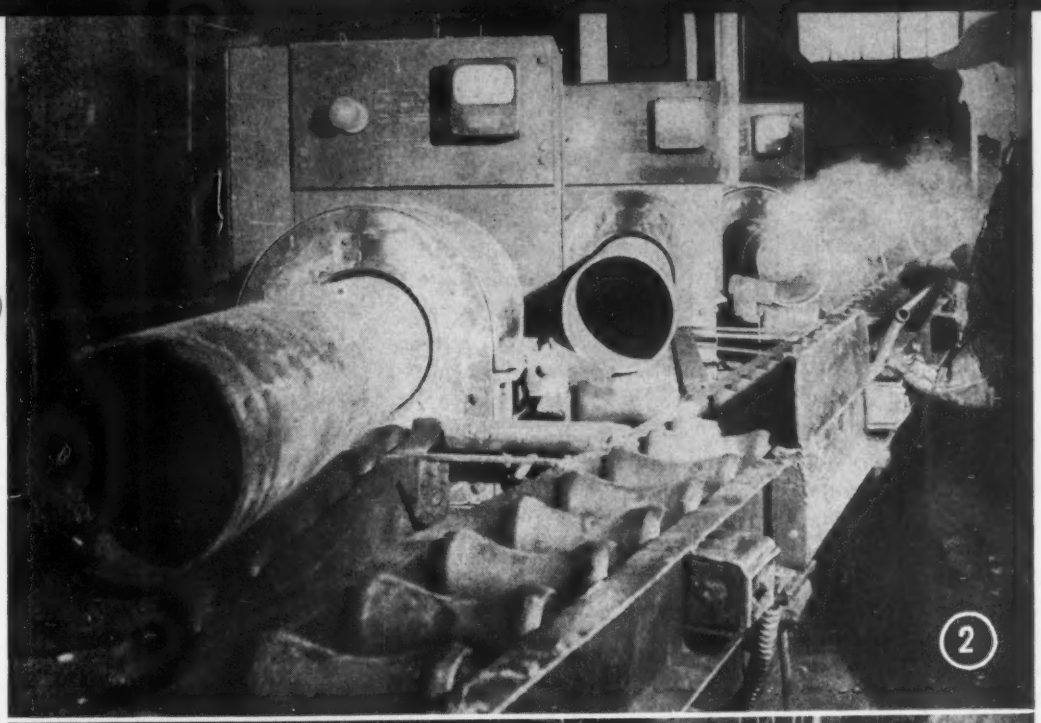


Fig. 1—Cold billets are loaded in chutes at top and uniformly heated pieces are ejected continuously at a high rate of speed from this Ajax-Northrup forging heater. Billets are pushed through each of four inductor coils by accurately timed, intermittently operated hydraulic rams. Production on this setup is 300 pieces per hour, each heated to the same temperature with little scale

Fig. 2 — Tubes for spinning pressure cylinders are heated at high speed by this battery of Ajax-Northrup heaters. Note integral conveyor line running down to the spinning machine

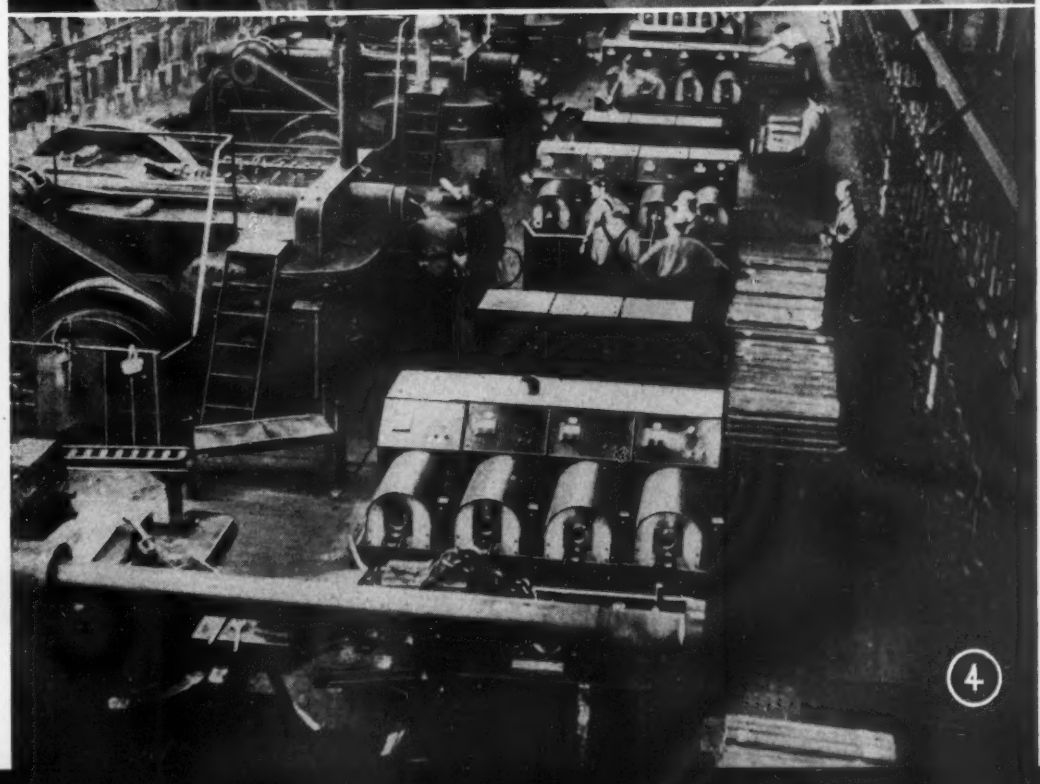


Fig. 3—High frequency bar heater located at right of upsetting machine heats 3-in. diameter bars to a temperature of 2250°F for a length of 19 in. in this setup

Fig. 4—Each forging machine in this large installation (only part of which is shown here) is served by seven Ajax-Northrup heaters. Forging operation takes 30 sec and a heated bar is ready every 34 sec

The heater can be designed as a compact unit, taking little floor space and requiring little open space around it.

Induction heaters should be located within a few feet, or even within a few inches of the forging dies. If the billets or slugs are to be handled manually, height and location of the heater should be such that the hot billet can be placed in the dies with one swing of the arms or body.

Methods selected for bringing the billets and slugs to the heaters, and for moving the hot pieces from the heaters to the forging or upsetting machine depend largely on the weight and size of the work piece. Roller conveyors are used in many plants handling heavy billets. Overhead monorails with counterweighted tongs are also successful. Small, uniform pieces can be handled best by roller chutes, conveyor belts, etc.

In some cases, the heater is designed with the chutes and conveyors integral with the heater, as shown in Fig. 1. This can be refined to the point where the heater is fed cold slugs directly from a cut-off machine, delivering the heated slugs to the forging machine without requiring any handling from bar stock to dies.

Feeding of the work pieces into the induction heating coils may be accomplished by many methods, the most popular of which are:

I. Continuous Feeder Mechanisms:
   (a) Pneumatic or hydraulic rams for vertical or horizontal work coils. Typical example is feeding cold slugs into one end, at the same time pushing hot slugs out the other end of the coil;
   (b) Rotary Tables;
   (c) Gravity-fed vertical coils, with cold slugs stacked into the top of the inductor coil, and hot slugs taken from the bottom.

Fig. 5—Typical floor plan, showing position heaters, billet handling equipment and motor generators power source

Fig. 6—Heating a hollow 10-in. diameter piece at rate of one every 60 sec on an automatically timed, conveyorized induction heating setup. Push button operation lowers heater coil and starts automatic cycle. Each bar gets exactly the same treatment

II. Moving coil, with work-piece stationary. Coils can move either vertically or horizontally on tracks or guides. Pneumatic or hydraulic rams, or electric hoists provide the motive power. Vertical moving coils are ideal where the work piece can be left right on the conveyor during the heating cycle.

III. Stationary coil, with work piece fed into it by pneumatic or hydraulic pusher. Can be arranged either vertically or horizontally.

IV. Split inductor coil, in two or more hinged sections, which opens up to speed loading and unloading.

V. Manual feeding, with tongs or gloved hands.

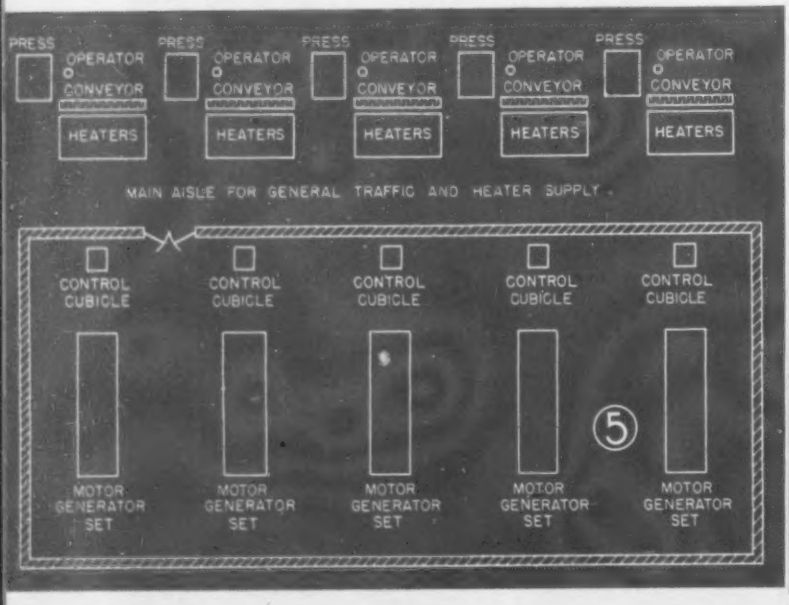
Any of the methods that use automatic loaders and ejectors provide a practically continuous flow of hot billets when heaters are operated in synchronized banks on batteries.

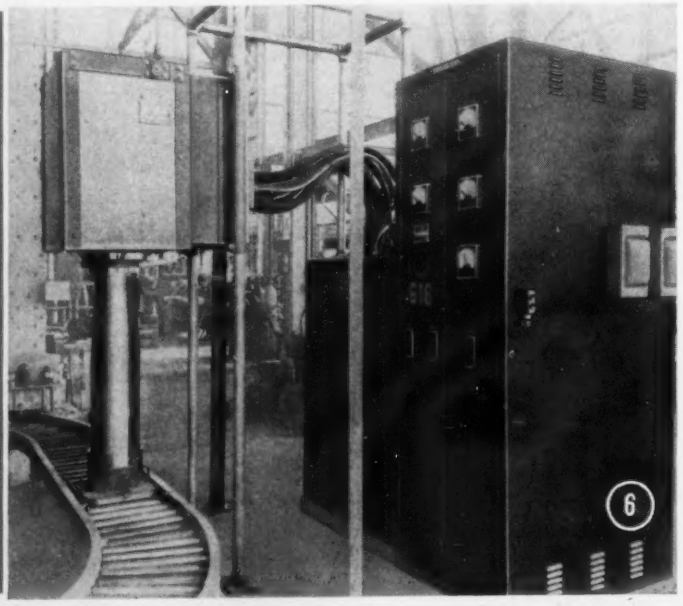
Automatic timing features are almost always included with production-line induction heaters. They cost relatively little because electrical power is so easy to control, but they greatly add to the efficiency of the whole forging or upsetting operation.

Automatic timing can be designed to control one or more of the following: Rapid heating power on and off, with accurately timed heating cycle; feeding or ejection mechanisms; speed or intermittent motion of conveyors; and signal lights, buzzers, and other signaling devices.

In a typical example, a billet is loaded on a pneumatic ram, a button is pushed, and the timing cycle starts with the ram pushing the billet up into the heater. Heating power then goes on automatically, with a red signal light indication. At the end of a predetermined heating cycle, the power is automatically turned off, the ram lowers, and the billet is ready to be moved to the forging dies. The instant the power is turned off the first heater, it is automatically applied to a second or stand-by heater which has been unloaded and reloaded while the first piece is heating. The first heater can now be unloaded and reloaded while No. 2 is heating so that full load is drawn from the generator at all times.

The cost of an inductor coil is (*Please turn to Page* 124)





Seen and Heard in the Machinery Field

By GUY HUBBARD
Machine Tool Editor

ARTHUR BAINTON'S FIFTIETH: Joseph Wickham Roe, industrial historian, once made a statement to the effect that—just as the merits of a university can to a considerable degree be judged by the careers of its graduates—so also can the merits of a manufacturing organization be judged by the caliber of the individuals who have developed within that organization.

Measured by that yardstick, the machine tool building organizations rank high. One typical case is that of the Brown & Sharpe Mfg. Co., Providence, R. I., which since it was established in 1833, has "graduated" from its apprenticeship and other training courses a distinguished group of alumni—one which would do credit to any institution such as the Massachusetts Institute of Technology.

As would be the case because of the wandering propensities of young men, some have left the parent company to seek their fortunes elsewhere. Many of these have met with outstanding success. All of them have been "loyal alumni". An unusually large number, however, have seen fit to remain with Brown & Sharpe and to devote their talents to the design and manufacture of the extraordinarily broad line of products manufactured by that company. One such is Arthur H. Bainton, general consultant for the company.

Time flies when a man keeps busy on useful work which he enjoys doing. Therefore, it was a surprise to Arthur Bainton on the morning of June 23, when he entered his office to find a bowl of 50 roses—one for each year of his service with Brown & Sharpe. Then Henry D. Sharpe, president and the son of one of the two founders of the company, appeared on the scene to present Mr. Bainton with a gold 50 year service pin. Like the others, Mr. Sharpe started in at the bottom. He also has spent at least half-a-century in the company's service.

Vine covered walls of ruined factory buildings beside moss-grown mill dams may be picturesque and attractive to artists and poets. What this country needs, however, are more institutions like that of Brown & Sharpe, which through foresight in training and retaining the services of generations of good men like Arthur Bainton, still are "going concerns", giving employment to hundreds and even thousands of people "making more and better things for more people" after more than 100 years of productive activity.

STANDARD SPINDLE NOSES: Sometime ago I spent an interesting and profitable day in the plant of one of the well known builders of engine lathes. Having begun my shop career as a lathe hand in a tool room, I had an idea that I knew something about running a lathe. It may be that I did know something about running lathes of 1915 vintage. However, I found that reflexes based on that experience are about as useful in connection with 1947 lathes, as those developed through operation of a 1915 "Stanley Steamer" are in connection with a 1947 Cadillac.

For example, I found myself constantly groping overhead for the belt shipper which wasn't there. Naturally there was no belt shipper because there were no belts to "ship". Controls were on the headstock and they were infinitely simpler, more convenient and safer than of old —but in my case their use involved "learning a new bag of tricks".

Getting back to spindle noses. I think the standardized variety on these 1947 lathes are a wonderful improvement over the 1915 variety. What a time we used to have with those old-fashioned screwed-on face plates and chucks! Each lathe had its own set. Apparently no two spindle noses were exactly the same. If they ever had been, they had been bunged up and the threads recut to smaller size. When chucks or face plates became mixed up, we either would get one "frozen" halfway on, or would have a wobbly fit. If we couldn't locate our own, then we had to machine a new back plate to fit the spindle nose.

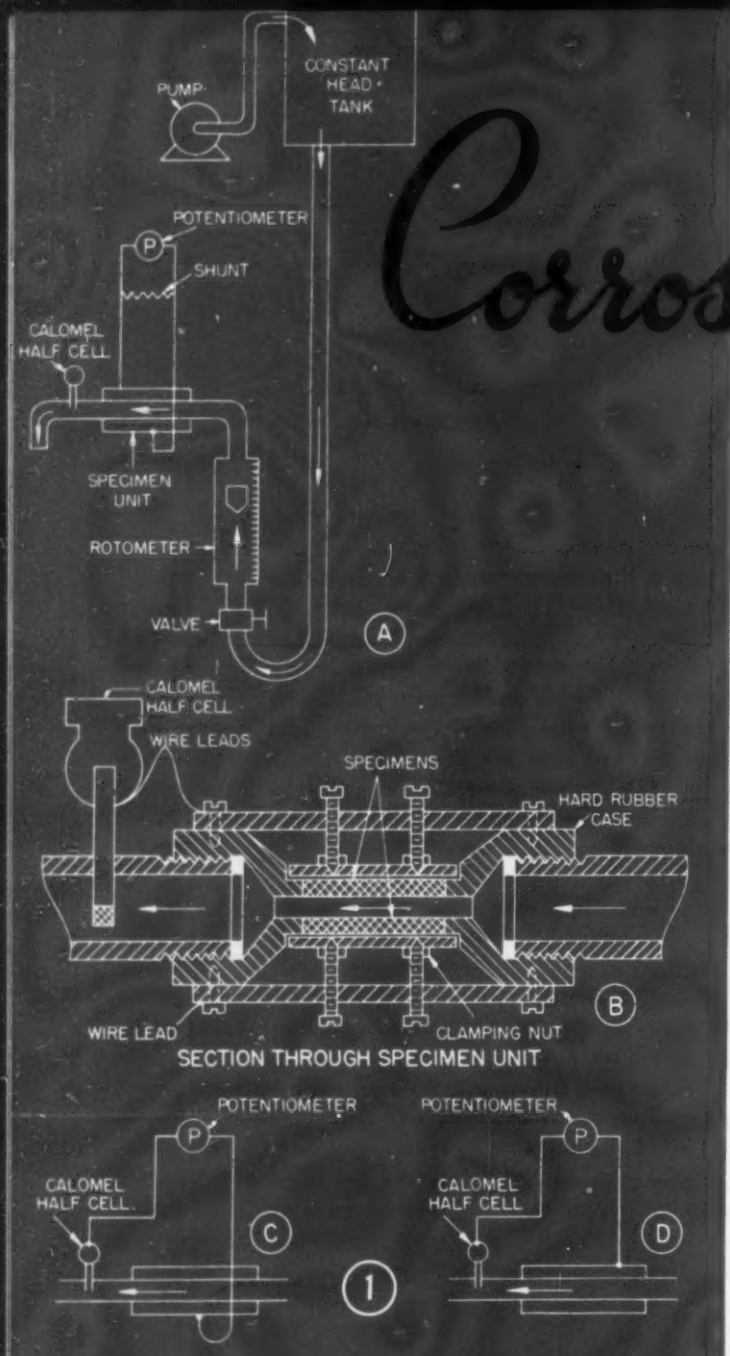
Then too, I have seen some dangerous things happen in connection with the old type noses. A neighbor of mine in the shop on one occasion reversed his lathe. The chuck —a large, heavy one—unscrewed itself and went rolling across the floor. On another occasion one of the workmen was boring a small bushing in a big chuck. His mind went on a fishing trip, from which it made a sudden return when the chuck dropped. He had bored the nose right off the spindle.

A strong association has had a lot to do with promoting and carrying through projects such as lathe spindle nose standardization. Individual companies sometimes have to yield something to the majority in such a cause, but in the end everybody is much better off.

LIGHTS ARE BURNING LATE: This page has been written in a Pullman car enroute from Cleveland to Boston. During the night I noticed that the lights were burning in the offices of some of the machine tool plants along the right-of-way. Lights burn late these nights in the engineering departments and experimental rooms of the plants of many of the 275 companies which are readying exhibits for the National Machine Tool Show to be held in the Dodge-Chicago plant, September 17-26, 1947. That is only two months away, and exhibits must be in well ahead of the opening date.

On the pedestal of the bust of the famous engineer James Buchanan Eads in the "Hall of Fame" at New York University, are carved his words "So much to do and so little time in which to do it!" That would be a fitting motto to hang on the wall of the engineering department of any machine tool plant in these United States today. I don't mean this as something to "needle" the engineers into greater efforts. I mean it as a tribute to the tremendous efforts which they have made and constantly are making.

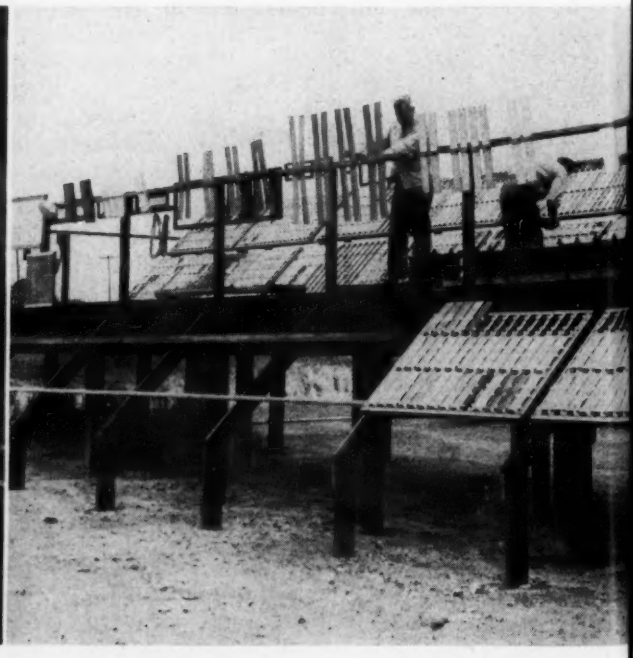
Corrosion Testing . . . EXPANDED



VIRTUALLY putting the ocean into a test tube, the sea-water corrosion testing station at Kure Beach, N. C., now in its twelfth year of operation, continues to pry from nature more and more of her secrets about that number one destroyer of materials—corrosion.

Roughly some 20 miles from Wilmington, N. C., and at the edge of the open sea, this vast installation is maintained jointly by International Nickel Co. and Dow Chemical Co. F. L. LaQue, corrosion research director for International Nickel, is in direct charge of the station, while J. A. Peloubet, of Dow's Magnesium Division, heads up the extensive work being done on the testing of magnesium alloys. In addition, there are C. P. Larrabee, corrosion expert with Carnegie-Illinois Steel Corp., who is head of that company's research program at the station and Professor W. F. Clapp of the Wm. F. Clapp Laboratories, Duxbury, Mass., is one of the country's fore-

Fig. 1—Schematic of test equipment used for determining potentials of galvanically coupled materials in moving sea water is shown at A. Cross section of the specimen unit is shown at B, while methods of wiring for measuring galvanic currents are shown at A, and open circuit potentials referred to a standard reference electrode at C and D



By RICHARD K. LOTZ

Facilities AT KURE BEACH

most authorities on deterioration of materials from attack by living organisms in sea water.

International Nickel established the station in 1935 for the purpose of comparing the corrosion resistance of low-alloy steels with carbon steels. That question has long since been answered insofar as under-water corrosion is concerned, for, as Mr. LaQue states, extensive tests show that there is no real difference. Both types corrode at substantially the same rate with slightly more pitting occurring in the case of the carbon steels.

While maintenance and development of the project are sponsored by International Nickel and Dow companies, many other materials producers also participate in the program. Furthermore, information obtained at the station is available to all industry. Kure Beach has, in fact, become industry's common battleground in a co-operative fight against corrosion. Some idea of the all-inclusive nature of the work conducted at the beach may be gleaned from the fact that virtually all materials are under test. From rope to steel to plastics to wood, the myriad specimens are subjected to the onslaught of marine corrosion as it occurs in actual service, rather than as it occurs in the laboratory in simulated tests.

Until two years ago, testing of submerged specimens was conducted in a large artificial lake or channel located well back on the shore. This channel was supplied with sea water by the pumps of a bromine plant operated by the Ethyl-Dow Chemical Co. The plant since has closed and so the large artificial lake disappeared and the under-water testing structures were moved to the basin, Fig. 4, formerly used as the intake for the pumps that supplied water for the plant.

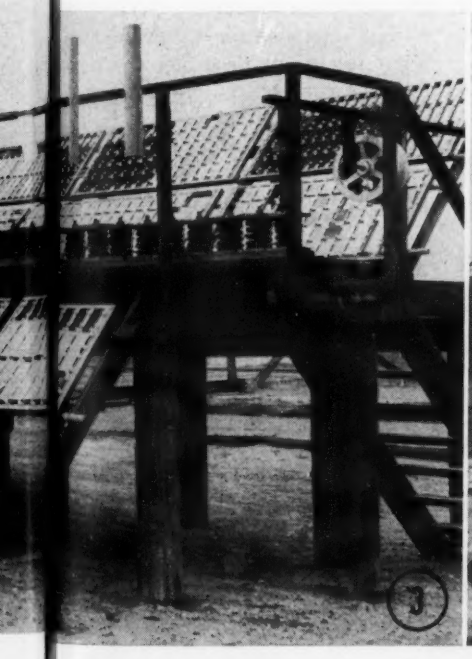
About 2000 specimens are submerged in this basin at present, and during the last 12 years the number so tested has been over 10,000. These specimens are suspended from the large wooden structure shown in Fig. 4, being submerged 3 to 4 ft under water. However, these under-water tests contitute only a part of the overall program. The pump house, immediately adjacent to the intake basin, has not been abandoned. It is used as a shop for repair and maintenance and, in addition, is gradually taking on the aspect of a very practical research laboratory. On its roof is a constant-head tank into which sea water is continuously pumped and from which water may be tapped for various tests at a known, constant pressure.

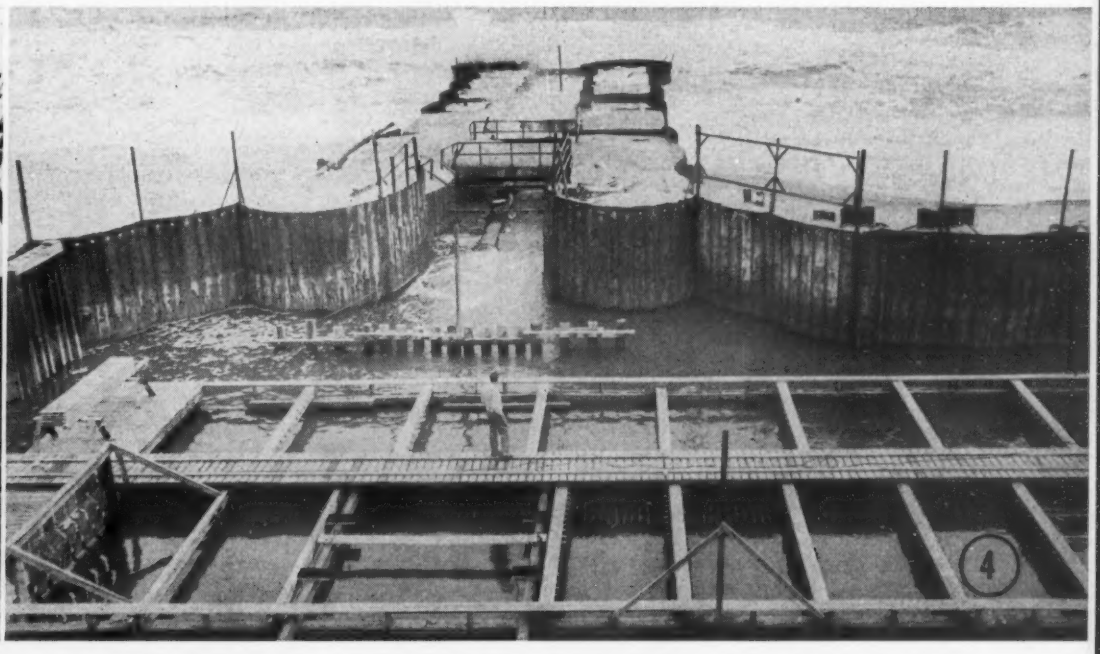
One such test which promises significant results particularly for the producers of condensers, is the jet impingement test, or rather series of tests, Fig. 2. Small rectangular specimens are submerged in tanks measuring about 3 x 5 in. in width and length and about 5 in. in depth, and subjected to impingement of sea water from jets at known pressure and rates of flow. In addiiton, the equipment is so designed that air bubbles may be added to the jet. To date, a wide variety of materials have been given this test and one of the noteworthy results has been that, contrary to traditional belief in some circles, the existence of air bubbles in the impinging stream has no perceptible effect on the rate of corrosion-erosion of the material.

Fig. 2—Condenser tube impingement test equipment located in pump house at Kure Beach

Fig. 3—Test platform and racks are located 80 ft from the open sea to test the effects of sea-spray on the metals

Fig. 4—Marine testing basin at Kure Beach, N. C. for testing effects of sea water on metals





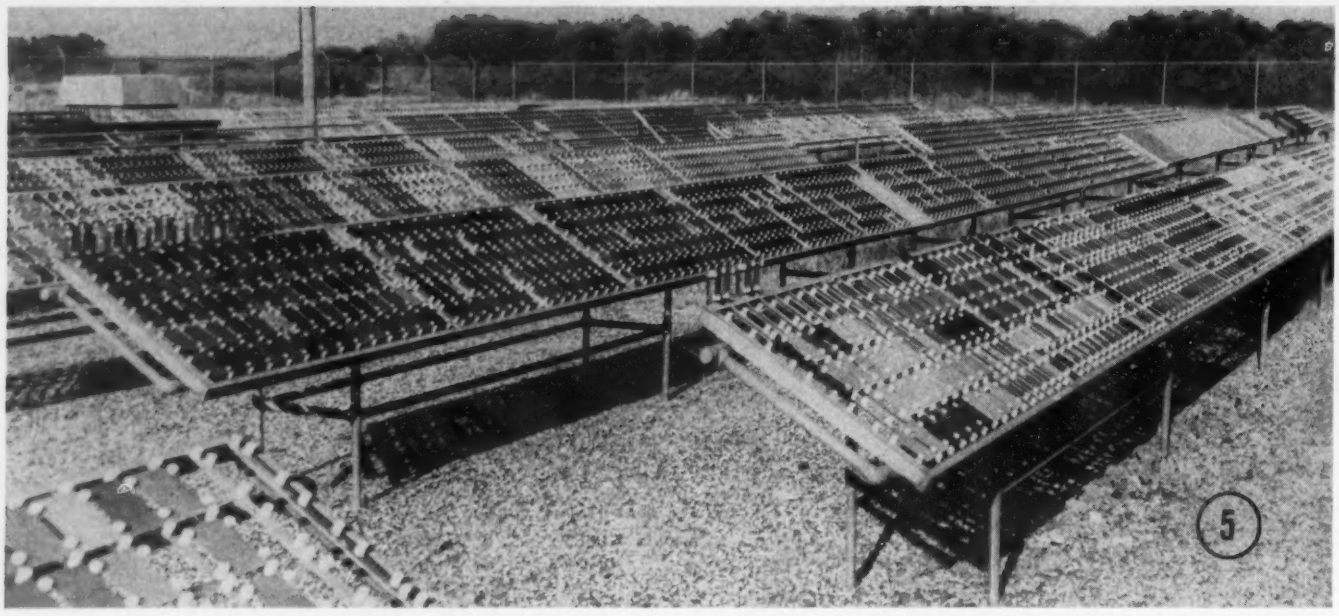


Fig. 5—These samples are located 800 ft from the sea to test atmospheric corrosion

Another test, conducted both in the marine basin and in special tanks in the pump house, is that in which specimens are mounted on a disk or series of disks. With the disks submerged and set to whirling, the specimens are subjected to the action of sea water in turbulent motion. Surprisingly enough, stainless steels 316 and 310 show better resistance to fast-moving sea water than they do to still sea water, whereas pure copper reacts in just the opposite manner.

One study showing great potential promise for the future, is just now getting under way in the pump house. Its purpose is to determine the electrical potentials of galvanically coupled materials in moving sea water. The equipment employed was originally developed for making tests in high-current-density nickel plating and is shown schematically in Fig. 1. As the detailed section through the specimen unit shows, these specimens are clamped into pockets of a hard rubber case and the sea water flows between and in contact with them. At the outlet side of the unit, a calomel half-cell is inserted into the line. Water at constant pressure is fed from the constant-head tank, through a valve which is used for adjustment of flow, through a rotometer indicating rate of flow and thence through the specimen unit.

The separate schematic sketches show how the specimens and the half-cell can be wired to a constant, known resistance plus a potentiometer in parallel, and a milliammeter. Limited tests to date show, for one thing, that the potential increases with increases in the velocity of the water past the specimens. There is no question but that the final, tabulated results of these tests, when made available, will prove of considerable value in many phases of marine engineering.

Beyond the marine basin and the pump house are the platforms and racks used for studying the resistance of bare and coated metals to the action of marine atmosphere and sea spray. One of these racks is set up about 80 ft from the shore. The racks at the 80-ft location, Fig. 3, are subjected to sea spray as well as marine atmosphere, while those at the 800-ft location, Fig. 5, are subjected to marine atmosphere only. Specimens are mounted on metal frames which face south and are inclined 30 degrees from the horizontal. Electrical insulation is provided by the porcelain knobs in which the specimens rest.

At the 80-ft location many of the specimens on test are magnesium alloys. Among the significant results on these are the fact that magnesium resists sea-spray corrosion extremely well, that 56 S aluminum rivets are better than 17 ST aluminum rivets for joining magnesium sheet because the latter set up considerable galvanic action, and that where steel bolts must be used to join magnesium parts subject to marine atmospheres, they should be cadmium plated and 52S aluminum washers used under the heads. Incidentally, Alclad magnesium sheet is now on test at the 80-ft location and thus far is standing up splendidly. The reasons for its use, of course, are to enhance appearance and corrosion resistance.

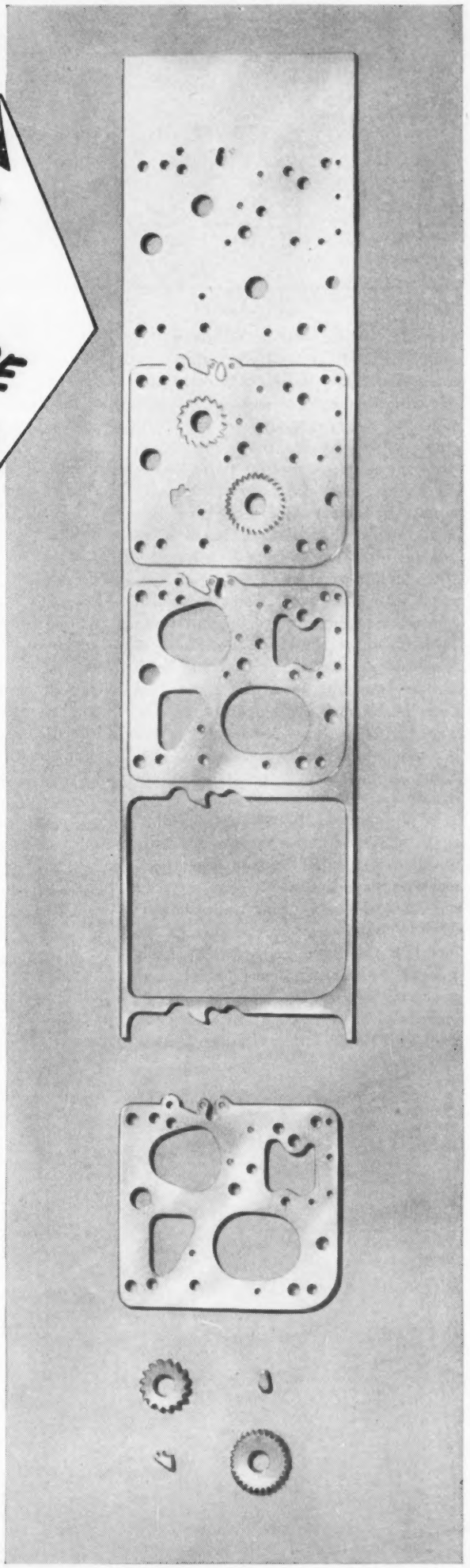
Three main sets of racks constitute the test setup at the 800-ft location. Five racks, plus a variety of magnesium castings and structural assemblies are maintained here by Dow Chemical Co.,

TABLE I
RELATIVE CORRODIBILITY OF ATMOSPHERES AT TWENTY LOCATIONS THROUGHOUT THE WORLD*

Location	Type of Atmosphere	Losses of Weights, Grams: Maximum	Minimum	Mean	Relative Corrodibility**
Khartoum, Egypt	Dry Inland	0.28	0.05	0.16	1
Abisco, North Sweden	Unpolluted	0.72	0.34	0.46	3
Aro, Nigeria	Tropical Inland	1.53	0.74	1.19	8
Singapore, Malaya	Tropical Marine	1.74	1.05	1.36	9
Basrah, Iran	Dry Inland	2.17	0.68	1.39	9
Apapa, Nigeria	Tropical Marine	2.94	1.47	2.29	15
State College, Pa.	Rural	....	....	3.75	25
South Bend, Pa.	Semi-Rural	....	....	4.27	29
Berlin, Germany	Semi-Industrial	4.83	4.55	4.71	32
Llanwrtyd Wells, British Is.	Semi-Marine	6.22	3.40	5.23	35
Kure Beach, N. C.	Marine	....	....	5.78	38
Calshot, British Isles	Marine	7.19	4.22	6.10	41
Sandy Hook, N. J.	Marine, Semi-Industrial	....	....	7.34	50
Congella, South Africa	Marine	11.13	5.61	7.34	50
Kearny, N. J.	Industrial-Marine	....	....	7.75	52
Motherwell, British Isles	Industrial	9.39	6.57	8.17	55
Vandergrift, Pa.	Industrial	....	....	8.34	56
Pittsburgh, Pa.	Industrial	....	....	9.65	65
Sheffield, British Isles	Industrial	13.40	8.75	11.53	78
Frodingham, British Isles	Industrial	23.40	10.37	14.81	100

*C. P. Larrabee, Trans. Electrochem. Soc. 87, 1945, 123-140 Table I.
**Frodingham=100

CLEVER PLANNING REDUCES SCRAP— SPEEDS MANUFACTURE



THIS photograph shows progressive steps in the manufacture of a clock frame, and is an excellent example of careful planning to reduce the amount of scrap and lessen the number of operations. Note that in only a few strokes of the machine not only is a plate punched for the frame, but also a gear, a ratchet wheel, and two other small parts are produced. The work is done on a dieing machine, which operates to the very close limits that are essential in a clock. An additional item of economy is the fact that most of the other parts are made from exactly the same kind and gauge of metal, greatly simplifying purchasing, stockroom management, and production ordering.

Planning such as this is more important than ever today, when metal is scarce, and it is essential to conserve it, as well as lessen costs and speed production.

The metal used is Revere Leaded Brass, supplied to exceptionally close limits as to composition, gauge, temper, flatness, and straightness. Revere takes pride in its ability to meet these strict requirements, and will be glad to collaborate with any manufacturer in working out the application of its metals to modern, simple, accurate, metal-and-money-saving plans and processes.

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TABLE II

RESULTS OF EXPOSURE OF SPECIMENS OF MONEL, NICKEL AND INCONEL IN THE ATMOSPHERE AT KURE BEACH FOR 4 YEARS

Material	Weight Loss in 4 Years (3" x 12¾" Spec.) Grams	Mdd.	Equivanent Penetration in Inches Per Year	Average Tensile Strength After Exposure—PSI	Change in Tensile Strength in 4 Yrs. Per Cent
Monel					
Monel	0.82	0.11	0.00002	72,900	+0.4
K-Monel	0.47	0.06	0.00001	205,000	—0.5
(Heat Treated)					
Nickel	0.72	0.10	0.00002	72,700	—0.2
Z-Nickel	0.66	0 09	0.000015	209,000	—0.8
(Heat Treated)					
Inconel	0.04	0.004	0.0000007	98,000	+2.0

twelve racks are maintained by International Nickel Co., and eight are maintained by Carnegie-Illinois Steel Corp. The latter two series of racks are devoted mostly to steels, ranging from the finest grades of stainless to the plain carbon types. In all cases, rust on steels having the highest resistance to corrosion is of a distinctly darker shade of brown than on the steels which are readily corroded.

Some idea of the relative corrosivity of the atmosphere at Kure Beach as compared with other atmospheres for which data are available may be obtained from Table I which shows weight losses of specimens of the British Iron and Steel Institute standard ingot iron exposed at Kure Beach and elsewhere. It will be seen that the Kure Beach atmosphere is representative of a marine environment of something more than average corrosivity.

A phenomenon consistently observed at the atmospheric test racks is the more severe corrosion of uncoated steel specimens on their undersides than on their top sides, the ratio being approximately 60:40. Undoubtedly this is due to the fact that the top sides are occasionally washed by rain and maintained comparatively dry by the sun, whereas the undersides are for all practical purposes shielded. However, this relative corrosion rate is reversed in the case of zinc-plated steels, which corrode most on their top sides.

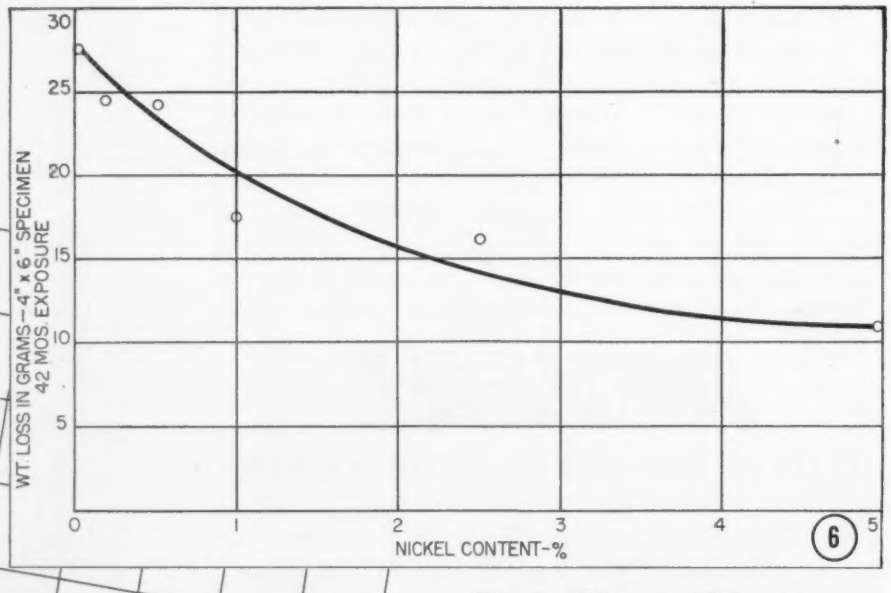
In general, steels which resist corrosion best show a strong tendency for rate of weight loss to decrease as the period of exposure is prolonged. Nevertheless, certain copper steels show little or no tendency for corrosion rates either to increase or to decrease with time. Copper has its most potent effect in open-hearth irons, and in the range from 0.004 to 0.02 per cent. Apparently in a marine atmosphere most of the advantage from the pressure of copper in steels is obtained when about 0.05 per cent is present, with little further significant improvement as the copper content is raised to as much as 1 per cent in either open-hearth or bessemer steels.

Phosphorus appears to have a fairly strong effect in improving resistance to corrosion, especially when the copper content is below the critical amount. While the high-phosphorus, low-copper steel is not particularly good, it is still much better than the low-phosphorus composition of similar and even slightly higher copper content. It is noted that steels containing phosphorus generally are superior to low-phosphorus steels otherwise similar in composition.

While tests thus far are not conclusive, there are indications that, in conjunction with nickel and copper, and possibly other elements, silicon may have a strongly favorable effect on corrosion resistance. As for manganese, present indications are that its effect is slightly beneficial.

Ace performers in bolstering the corrosion resistance of steels are nickel and chromium. Nickel has a uniformly beneficial effect which is roughly proportional to the nickel content, as illustrated by the graph, Fig. 6. Apparently, in steels containing more than the critical amount of copper (about 0.05) and less than 5 per cent total alloy, nickel is the most potent element in improving resistance to marine atmospheres. Nickel also shows up to advantage in complex steels in which it was supplemented by copper,

(*Please turn to Page* 130)



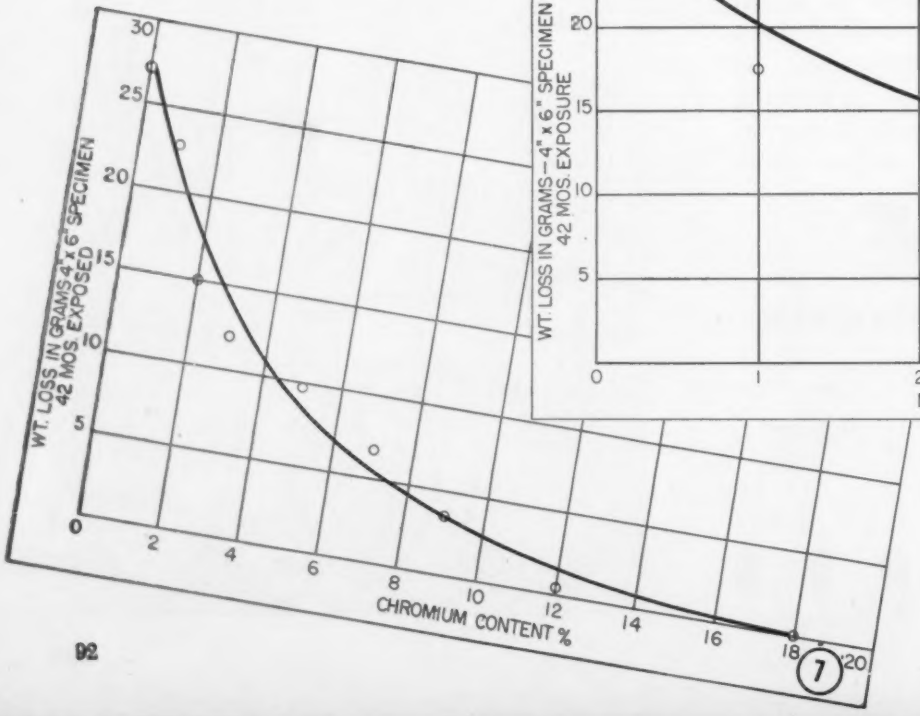


Fig. 6—Effect of nickel content on corrosion of steel in marine atmosphere at Kure Beach, N. C.
Fig. 7—Effect of chromium content on corrosion of steel in marine atmosphere at Kure Beach, N. C.

saves hours of machining time

The internal upset operation pictured here is typical of the many forming operations which The Ohio Seamless Tube Company is equipped to perform — operations that will help cut your production time and costs. On this particular application, the specifications called for tubing with heavy walls at one end only; the internal upset operation, performed on OSTUCO Seamless Steel Tubing by skilled craftsmen, completely eliminated the long, costly machining process formerly required.

•

The manufacture of countless products in a wide variety of industries has been expedited through the use of OSTUCO Seamless Steel Tubing, formed to the most exacting specifications. Our sales engineers will gladly show you how OSTUCO can simplify your production problems, help cut production costs to a minimum and make yours a better product. Send us your specifications and blueprints.

THE OHIO SEAMLESS TUBE COMPANY

Plant and General Offices: SHELBY, OHIO

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Engineering News *at a Glance*

CUTS HANDLING MANEUVERING: New steel pallet, designed to cut down shipping costs through light weight and to reduce handling costs through 8-way lift utility is to be introduced to the Railway Supply Manufacturers Association in Atlantic City during the latter part of this month. Developed by Monroe Auto Equipment Co., Monroe, Mich., the new unit permits forks of a lift truck to be slipped between the top and bottom sections from four sides and four corners, cutting down maneuvering necessary in crowded plants. Both top and bottom sections are held together by nine hollow steel posts, crimped to hold both sections together. The pallet will hold loads up to 20,000 lb.

"SEEING EYE" FOR SHIPS: Night vision for one of America's new ocean liners will be provided by a "giant eye" now under construction in a Westinghouse plant. It's the largest, most powerful incandescent searchlight ever built for a ship, according to the company. The 24-in. light casts a 5,850,000-candlepower beam—equivalent of some 90,000 sixty-watt bulbs. Its lens is capable of withstanding any sudden change in temperature—from live steam to ice water.

HEAVY CONSTRUCTION BACKLOG: H. E. Widdell, president, Arthur G. McKee & Co., recently reported to the Cleveland Chamber of Commerce that his firm currently is working on a $50 million construction backlog. Two-thirds of this is in the oil refinery field, mostly for new installations, and one-third is in the iron-steel field, the bulk for equipment replacements.

LOCATES BUBBLES IN METAL: Supersonic test method developed in Germany locates bubbles in sheet metal which are too minute for x-ray detection. It tests the sheet for faults by comparing the energy of supersonic vibrations before and after passage through the metal, the Office of Technical Services, Washington, reveals. Any more than the normal drop in transmission indicates presence of a fault. Tests show that a bubble only one-hundred-thousandths of a millimeter in diameter can increase the drop a hundredfold. Though a bubble filled with slag or rust does not cause so great a drop, it is easily detected. According to the bureau, the device that generates the supersonic vibrations uses a 15-w quartz crystal sender operating at 1000 kilocycles, and "wobbles" the frequency 100 cycles per sec to avoid standing waves in the test metal. Vibrations are transmitted by means of a metal block to a narrow chamber of running water. The latter makes contact with one edge of the test metal to pass on the vibrations. Sending and receiving units are mounted on opposite ends of a long pair of tongs. In operation, the tongs straddle the test piece and move along its edges.

BATTERY REVIVER: In Bridgeport, Conn., it was learned, General Electric now is placing on the market two lightweight battery chargers that will put new life into the average rundown battery in 24 hours or less. One of the units charges an average truck or auto battery in 12 hours or less, the other will bring a normally rundown automobile battery up to operating efficiency within 24 hours. Charging rate of both units is automatically tapered from high to low, as the battery gains its charge.

FRICTIONLESS TRANSMISSION: To avoid all friction in the transmission of impulse signals, Askania Regulator Co., Chicago, recently developed a flexible pivot for use in all its lever transmission systems incorporated in bellows, diaphragms and bourdon tubes. Of rigid design, it can be mounted in any position without loss of calibration of the controllers. Because total motion of the levers thus supported is relatively small —only a few degrees—the spring characteristic is linear, and for most applications negligible. The design also ends troubles caused by corrosion, dirt or poor lubrication.

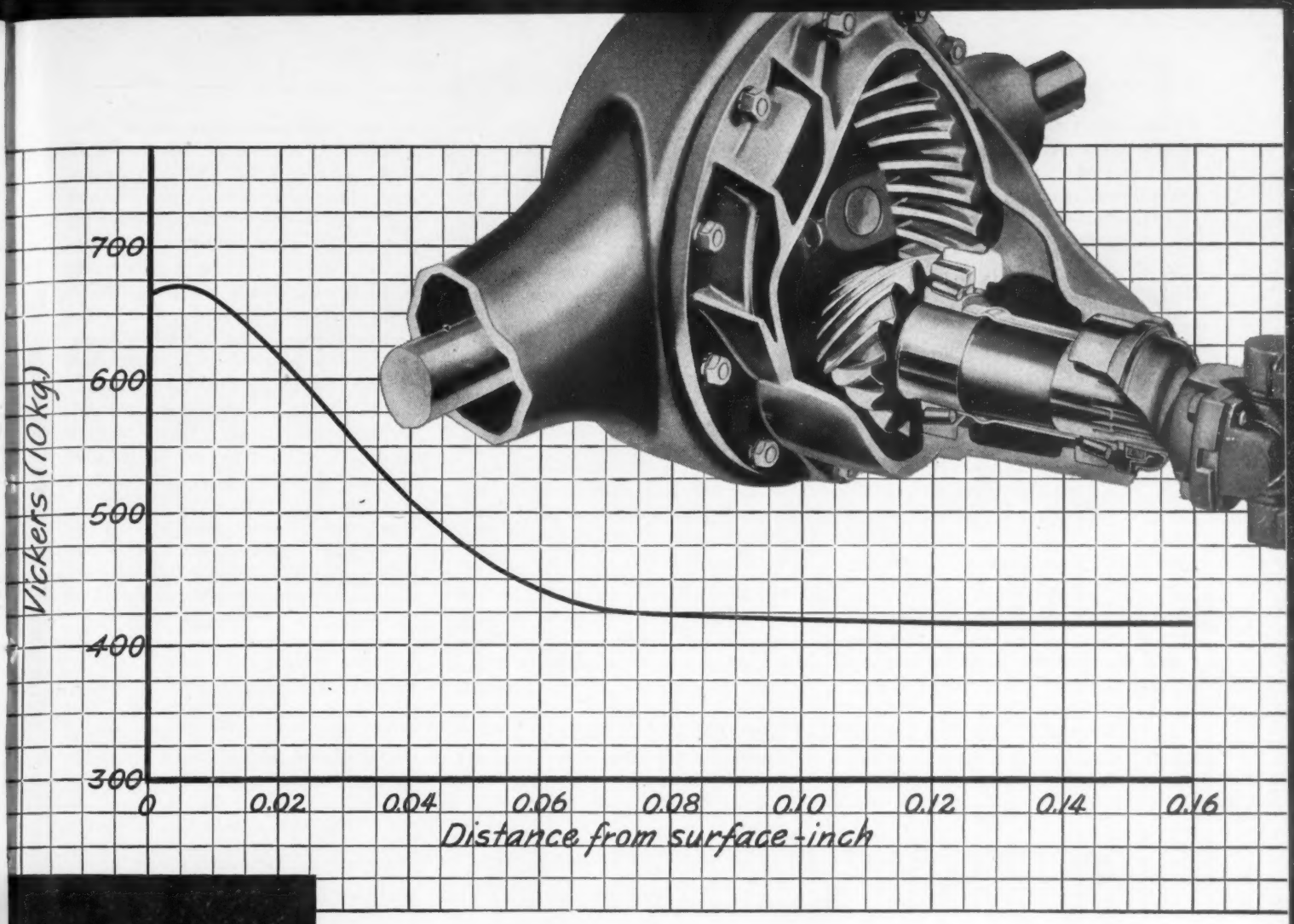
TO HELP "CANNING" PROGRAM: In Akron, it was learned, Goodyear Aircraft Corp. recently acquired some 115,000 sq ft of additional floor area for manufacturing operations on the new Navy "canning" program—the one under which the sea-going service branch plans to preserve in fly-away condition more than 2000 surplus carrier and trainer aircraft. In turning out the huge steel containers for housing the planes, the company expects to employ about 300 persons during peak operations of the program.

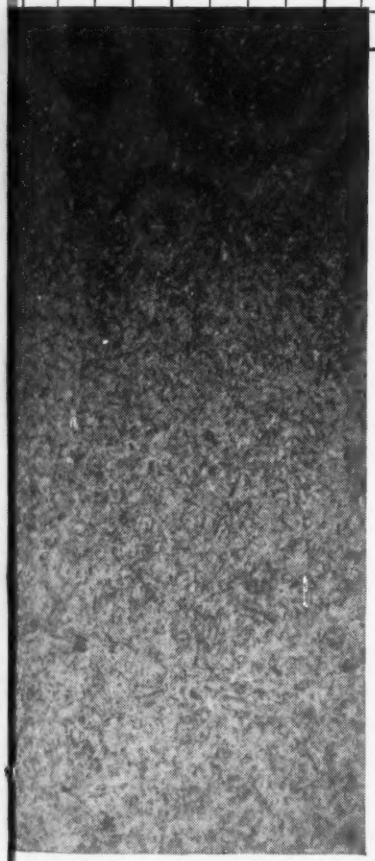
LONG ON WEARING STAMINA: Piston ring developed for its forging hammers by Chambersburg Engineering Co., Chambersburg, Pa., is reported to have wearing qualities that extend its useful life threefold or better. According to the company, which also is marketing the ring generally, tension is maintained throughout its life. During processing, it is heat treated by being mechanically fed through an electronic heater work coil that is immersed in oil. Power output of the generator and speed of feeding device are regulated so section of the ring passing through the coil is heated to 1600°F, and immediately quenched as it passes from coil into oil quench. Ring is tempered in the same continuous mechanism, the feeding device being raised above the level of the oil quench and speed and generator output adjusted so the ring is reheated to 950°F and cooled in still air.

SHEET METAL MOTORS: Rocket motors of sheet steel are being produced successfully by Solar Aircraft Co., San Diego, Calif., for use in the rocket development work now under way at California Institute of Technology. The company reveals that after passing hydraulic tests, the motors proved highly satisfactory in firing tests at White Sands proving grounds in New Mexico. They also were found to provide the same propulsive force of other type motors with considerable saving in weight. According to Solar, the motors are entirely suitable for quantity production.

MAY POINT OUT ORES: Application of recently developed techniques of mineral detection by analysis of surface waters, certain parts of plants, and the existence of indicator plants, may lead to the disovery of important mineral deposits, among them ores that cannot be traced by ordinary geophysical methods. Kalervo Rankama, attached to the University of Chicago, points out in *Mining and Metallurgy*, that these new skills, known as chemical, biogeochemical and geobotanical methods, may provide geologists with far more information on the chemical composition of ore bodies. They also may provide a more direct method for prospecting and locating ore bodies of specific metals than have the detailed examination of surface rocks, and results of various geophysical methods that are now used.

TESTS HARDNESS TESTERS: Clark Instrument Inc., Dearborn, Mich., reports it will provide free inspection service on all of its hardness testers sold by the War Assets Administration. According to the company, the machines will be cleaned, tested and inspected without charge if returned to the factory by the purchaser—provided the latter pays shipping charges both ways. It is pointed out that many machines sold by WAA on an "as is" basis suffered from neglect. Those





Photomicrograph (100x) and hardness penetration graph of Chromium-Vanadium A 6120 steel, with a light case (0.80–0.85% carbon) in outer .010 inch.

BONDED FOR LONGER LIFE

The secret of the outstanding strength of carburized parts made of Chromium-Vanadium A 6120 steel is revealed in the above chart. The noteworthy feature is the even slope of the curve, representing the *gradual* decrease in carbon penetration.

There is no sharp dividing line between the case and core—no shell to be shattered by shock or repeated stress. On the contrary, Chromium-Vanadium A 6120 carburizing steel is notable for the firm, well-integrated bond which results from the characteristically uniform decrease in hardness penetration from case to core.

The accompanying photomicrograph is further convincing proof of this exceptional integration or bonding.

For such vital parts as gears, cams, splines, shafts and bearings, the use of A 6120 Chromium-Vanadium carburizing steel assures superior performance and longer service life, in addition to over-all economy.

Our metallurgists will be glad to work with you on your carburizing problems.

VANADIUM CORPORATION OF AMERICA

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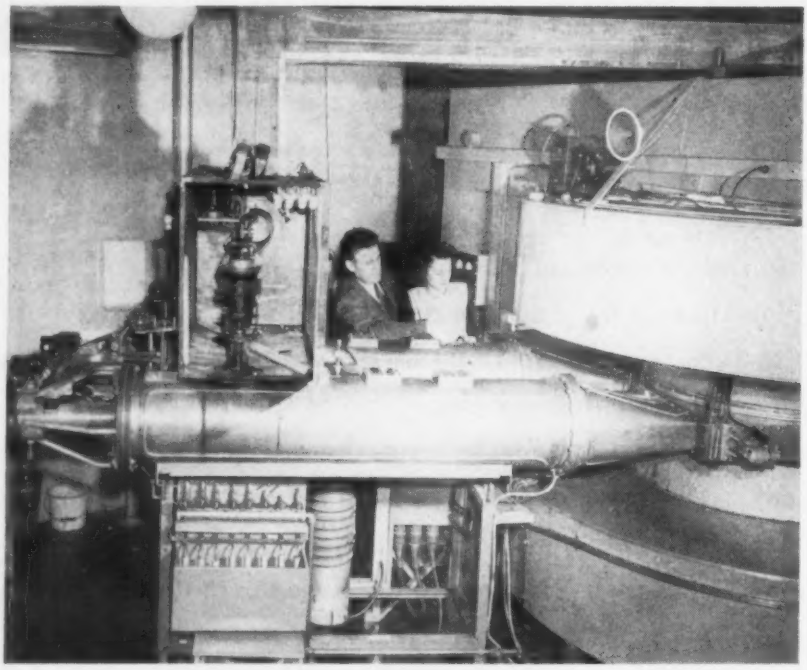
testers needing repairs will be placed in good working order at actual cost of materials and labor, with estimate of costs being furnished the owner for his approval before any work on the instrument is done.

UNDERGROUND GAS STORAGE: National Tube Co., U. S. Steel subsidiary, is collaborating with Public Service Co. of Northern Illinois in a project experts believe may revolutionize the natural gas storage field. The project provides for gas storage underground rather than present storage tanks above ground, gas being stored in high pressure torpedo-like steel pipe sections supplied by National Tube. Recently the utility started work on an installation on a 160-acre tract at Mount Prospect, Ill., nearly forty times as large as the completed pilot installation at Kankakee, Ill. The new project is expected to have a capacity of 40,000,000 cu ft. Underground storage, it is said, provides lower cost of initial installation, operation and maintenance. In addition, storage is in numerous units. This enables any section to be taken out of service for quick repairs. Pipe sections are of 24-in. seamless molybdenum steel, similar to that used in the "Big Inch." Each section is 40 ft long with a capacity of 25,000 cu ft at 2240 lb pressure. They also are nosed in at the ends, and machined for connection to one another.

TOOLS TO TEXTILES: Production of woolen yarn is simplified by a new textile machine developed recently by Warner & Swasey Co., Cleveland. The "pin drafting" machine, as it is called, is expected to find a wide market in the textile field because it can be used to blend cotton and synthetic fibers equally as well.

OPERATES HUGE AAF LAB: Aircraft gas turbine engines now under development at the huge Curtiss-Wright laboratory operated for the government, approach the combined power output of four Cyclone-type engines in the Boeing Superfortress and the new type Lockheed Constellation transport, it was revealed recently. The new lab, located at Wood-Ridge, N. J., is being used for testing all major sections going into such an engine. Here, basic sections of each new engine can be checked without operating the complete engine. Layout of the laboratory, termed the largest government research project under private operation, reduces substantially many serious bottlenecks attendant in the production of aircraft power plants. Its dynamometers, used to measure power produced by turbines under test, are designed to measure up to 20,000 hp. Wiring used is equal in length to that required for 1500 six-room houses. More than a ¼-ton of mercury is contained in the manometers —pressure vacuum gages that enable personnel to check the behavior of turbine sections. Some of these laboratory instruments measure 180 in. or 15 ft in height.



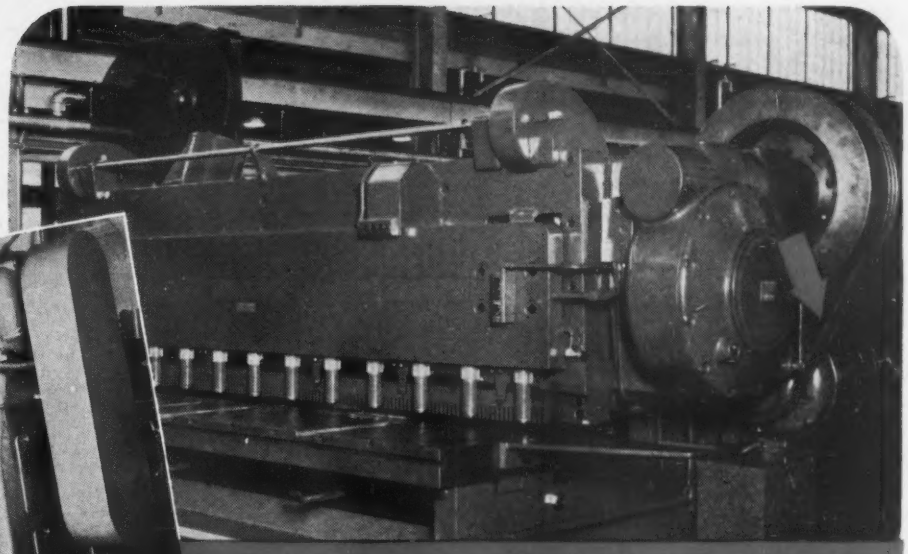
ANOTHER PROBER: University of Pittsburgh's 100-ton, 20-million-volt cyclotron, now in operation deep in a hillside of the school's campus, consists mainly of a vacuum between the poles of a giant electromagnet. Pointing to the ion source, in the accompanying view, is Dr. A. J. Allen, Westinghouse professor of graduate engineering in charge of the project. In the installation, copper tubes, called D-stems, are used to transmit energy from a 100 kw short wave radio oscillator (in cage, left center foreground) which provides 200,000 v "pushes" for the ions circulating in the duraluminum vacuum chamber—shown between circular tanks at right. The tanks contain some 18 miles of copper coiled about magnet poles and cooled by 467 gallons of special cyclotron oils recently developed by Gulf Oil Corp. Believed by scientists to open greater possibilities for scientific advances than did the x-ray, the cyclotron will use atomic energy to unveil new fields in medicine and industrial research

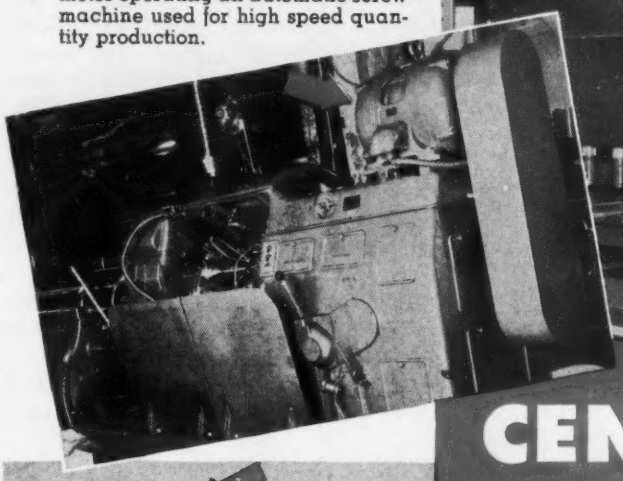
BOOSTS TOOL LIFE 4000%: In Chicago, tool engineers from Illinois Tool Works designed and produced special carbide tipped milling cutters for Reliable Electric Co. which enable the latter —in manufacturing split-bolt connectors from special free-cutting bronze—to operate its horizontal millers 1200 hours before regrinding. This represents a 4000 per cent improvement in tool life. Formerly, the cutters used by Reliable in cutting deep axial shots in the bolt bodies were averaging only 30 hours of operation between grinds. In addition, the precise multiple tooling setup required when changing tools resulted in the loss of some 10 per cent of the available machine time. Now, time loss for the same operation is well below 1 per cent.

COUNTS STEEL SHEETS: Electronic counters produced by Potter Instrument Co., Flushing, L. I., N. Y., are now used by several large steel companies to pile tin plate in precise predetermined quantities as the sheets leave the flying shear. Currently, sheets are stacked at the rate of 1200 per minute, although the counters are capable of doing the same work at rates up to 15,000 per minute. In the present operation, the desired count is selected by dial switches on the front panel of the instrument. A photoelectric detector picks up the count and actuates the counter. At the completion of each predetermined count, a high speed relay actuates a deflector mechanism for channeling the tin plate into the proper pile. For lines with only one prime piler, sheets are channeled into a "waster pile" until a skid can be placed on top of the first pile. In lines with two prime pilers, the batches of sheets are channeled automatically alternately between the two piles.

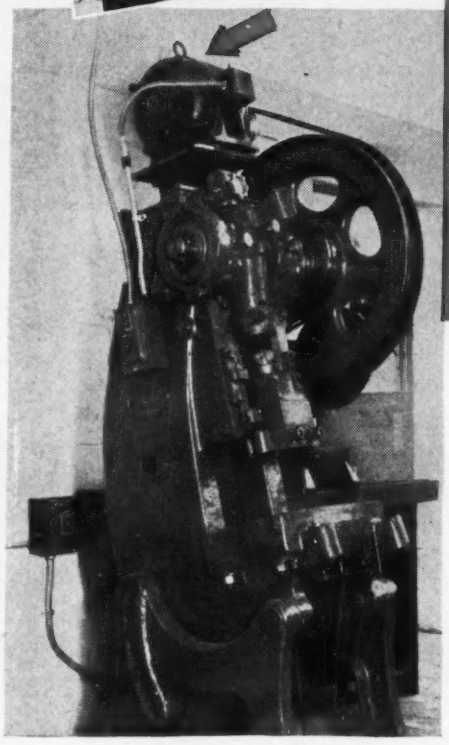
At right — Century 30 Horse Power high torque, high slip motor operating a heavy duty shear. High slip motor reduces the shock loads when shearing heavy plate.

Below — Century 20 Horse Power motor operating an automatic screw machine used for high speed quantity production.





CENTURY MOTORS
Assist in maintaining close tolerance in production . . .



Century 2 Horse Power, open-rated general purpose motor operating a punch press making small parts.

Thousands of Century motors on machine tools in modern feeder departments are helping to maintain production schedules and keep assembly lines running. The unusual freedom from vibration of these motors assists in maintaining close tolerance in production.

Century machine tool motors are built to stand up under the toughest operating conditions. Their rugged frames, accurately machined feet, large shafts, accurate alignments, good mechanical and electrical balance — all contribute to their outstanding performance.

Century builds a complete line of electric motors and generators, fractional and integral horse power, in the popular sizes to meet the requirements of industrial production, processing, and appliance needs.

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METAL STAMPINGS

—At Phenomenal Speeds

New type high speed punch press using dies actuated by rotary action is capable of producing millions of ferrous and nonferrous stampings at the rate of 1800 strokes per minute. Stock is fed through friction feed rolls to and through stripper plate which shuttles back and forth on horizontal plane with no vertical movement whatsoever

GREAT increases in production of ferrous, nonferrous and fibrous stampings are realized with a new type high speed press which has been in operation for over 3 years at Cleveland Pressed Steel Co., subsidiary of Lempco Products Inc., Bedford, O. Described by its designers and builders as the fastest press in the field, the Lempco Hypermatic 10-ton model operates at speeds up to 1800 strokes per minute, with stock feed of approximately 5600 lineal inches per minute.

The company's 50-ton press will work stock fed at rates up to 10,000 ipm. Mass production with machine gun rapidity of small items such as metallic electrical parts and fasteners—square and hex nuts, flat or crowned; washers, etc.—is an accomplished fact and a day-to-day occurrence.

New Principles: Whereas the action of all other punch presses is reciprocal, this press employs the use of a rotary motion in actuating the dies. Four crankshafts are used; the upper two, rotating clockwise, drive the upper die head while the lower pair of crankshafts, counter-clockwise in motion, drive the lower die head.

Die members mounted in antifriction die sets, also a Lempco design, are mounted between the two die heads, the punch holder being fastened to the upper head and the die holder to the lower die head. Punches and dies, therefore, have the same rotary motions as their respective die heads, closing and opening in each cycle of the crankshafts, giving the advantage of cutting the stock while it is actually in horizontal motion.

Stock is fed from right to left through friction feed rolls to and through a stripper plate which shuttles back and forth on a horizontal plane with no vertical movement whatsoever. Both the punch and die approach and recede from the stock, leaving it entirely free to move from one station to the next without interference.

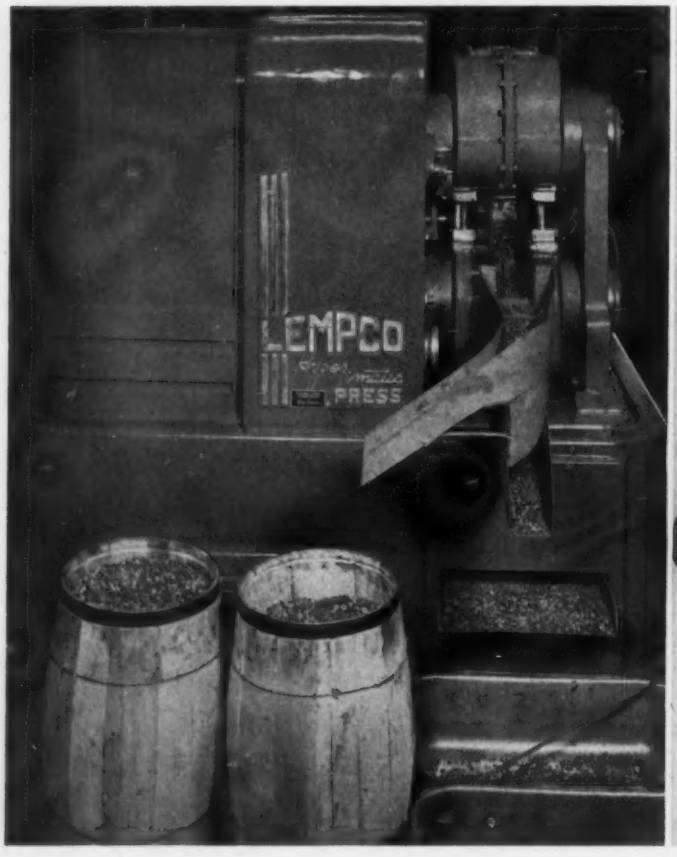
No conventional flywheels are used. In the case of most conventional presses operation depends on intermittent drawing of energy from the flywheel "storage".

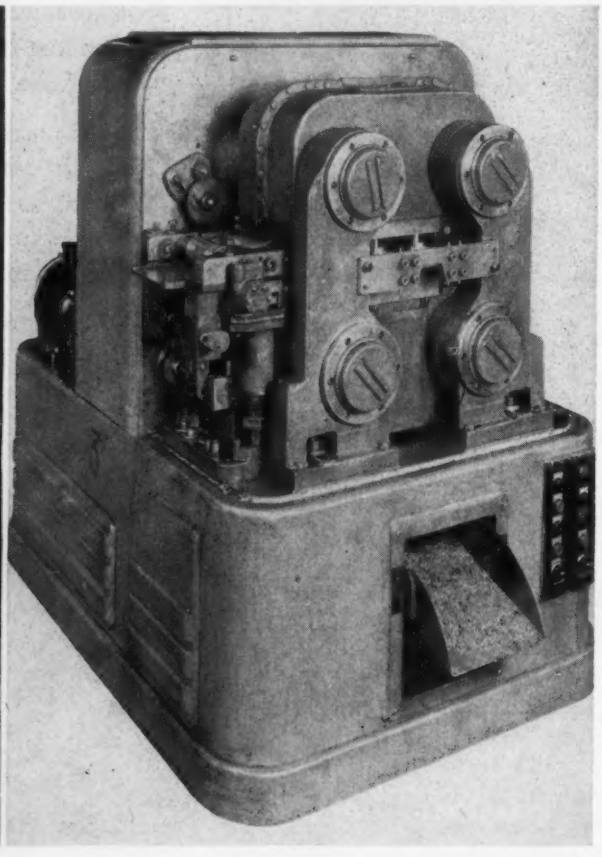
This results in shock loading of all press parts and a resultant shock force is translated directly to the crank. This press, in effect, uses a "flywheel die head"; at each cut, the force required merely subtracts from the circular inertia of the heads and no perceptible shock load is received by the crank. Wear on the crankshafts is therefore negligible.

Smooth action combined with ample power make possible "jogging" the press through any part of a complete cycle; the 10-ton model can be rotated with a 12-in. wrench on one of the crankshafts. Crankshafts rotate in antifriction bear-

Fig. 1 (left)—High speed punch press producing 10-24 hex machine screw nuts at rate of 1150 per minute

Fig. 2 (right)—"Butterfly" type lock washers are turned out at 1700 per minute; 450,000 are produced without a die grind



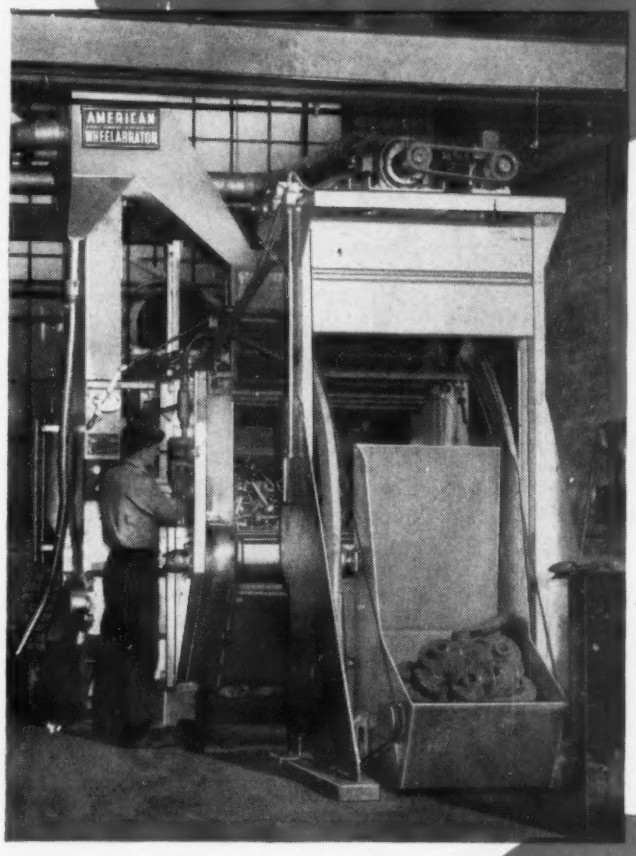


Airless WHEELABRATOR

Cuts Cost 31% in cleaning

HEAT TREAT SCALE

at Kropp Forge Co.



Heat treat scale removal was a time consuming, costly operation with air blast equipment at the Kropp Forge Co., of Chicago, Illinois. Increased production requirements were much greater than existing equipment could handle.

American Engineers made a thorough investigation of this problem, and then recommended the installation of a 27" x 36" Wheelabrator Tumblast. Since this machine has been in operation, cleaning costs have been reduced 31%. These drastic savings can be directly attributed to the amazing speed with which forging scale is thoroughly removed.

In the magnafluxing department, where forgings are inspected for surface defects, time was reduced by 12%, due to the uniformly cleaned surfaces produced by the Wheelabrator.

When additional equipment was required to handle larger aircraft forgings, a 36" x 42" and a 48" x 72" Wheelabrator Tumblast were installed. These three machines clean the entire daily production of more than five tons of forgings every hour.

USED IN MODERN HEAT TREATING AND FORGING SHOPS THROUGHOUT THE WORLD

Chrysler Corp.
Chevrolet Gear & Axle Div.
Bendix Products Corp.
Warner Gear Co.
Timken Roller Bearing Co.
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L. S. Starrett Co.
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Ross Gear & Tool Co.
International Harvester Co.
and many others.

Write for our latest treatise "CLEANING PROBLEMS SOLVED for Heat Treated and Forged parts". Contains complete case history data, comments from typical users, parts cleaned and a wealth of other material applicable to heat treat and forge plants.

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ings, under oil pressure, at both ends of the main housing and in the outer bearing brackets. They are driven through a transmission of precision machined herringbone gears, meshed twice horizontally and twice diagonally. This geared transmission is completely enclosed in the main housing and operates in an oil spray.

Velocity: As yet, very little is generally known about the advantages of velocity in a stamping operation. Heretofore, on all other presses, the cut was made at the slowest motion of the ram; just before it came to a complete stop and returned to complete the cycle.

As an example of the advantages of speed at the moment of entering the cut, the Smithsonian Institute has on exhibit a fence post which was penetrated by a wheat straw during a tornado. The National Geographic Society has on record a live tree which was cut into about 3 in. by a piece of wrapping paper which flew on a horizontal plane during a cyclone. Both the straw and the paper were traveling so fast that the inertia of the materials was sufficient to overcome the resistance of the wood. Velocity of die heads at upwards of 1000 strokes per minute are likened by the machine's designers to this phenomenon.

Punches of even small dimensions stand up unusually well with little or no breakage. The speed of the punch action is like that of a bullet. A .22 caliber projectile, at full muzzle velocity, will penetrate a pane of glass as though it had been drilled. A loss of muzzle velocity will establish radial cracks and even remove the entire pane. For these reasons informed observers remain undisturbed when punch and die engage the stock for the first and last "hit" of a strip of stock. The press will stamp out halves, quarters or minute fractions of a stamped part without damage to the punch or cut edge.

High velocity results in about 10 per cent cut and 90 per cent break producing superior stampings with less burr, distortion and draft than ordinarily would be possible. On this press it is common practice to register the stamping so close together that length of scrap between blanks is less than the thickness of the metal and the metal "stands up" instead of "mushing down" as is customary. On long runs, the stock saving is tremendous.

This velocity also reflects itself in die life. The quick, sharp "cut and break" eliminates to a great extent the heat creating friction and the die together with the parts therefrom are never uncomfortably warm even after a long continuous run.

Vibration and Inertia: Any force developed in this press has its opposing similar force and these forces are absorbed by each other, rather than by the machine itself or by a heavy concrete foundation. There is no provision for floor bolts; the machine will stand indefinitely where placed. One of the distinct features is the counterbalance in both upper and lower heads. These counterbalances automatically compensate for any change in length of stroke. Regardless of the stroke length the counterbalance is always opposite the throw so that the heads are in balance at all times.

Stroke of the Hypermatic press is flexibly adjustable to 45 different positions. Adjustment is very simple and within the ability of any average mechanic. The arrangement is such that the stroke adjustment is made on all four cranks simultaneously. Locking mechanism is positive; there is no possibility of any of the crank mechanisms to slip out of adjustment.

Stock Feed Rolls: Conventional or hitch feeds are of little value when operations call for stock feeds of 1500 lineal inches or more. It is a well known fact that it is practically impossible to control stock feed at approximately 1200 lineal inches per minute on the conventional punch press. The stock may or may not feed up to the stop perfectly; it may feed too fast and rebound or in case of light gage stock may feed too fast and buckle.

Feed mechanism of this high speed press is heavily built, roller type, positive in action and feeds stock with precision at the highest operating speeds. The feed roll speeds are synchronous with both press speed and pitch of the part being produced. Maximum in stock feeds, as previously stated is approximately 5600 lineal inches per minute on the 10-ton model and 10,000 lineal inches per minute on the 50-ton model.

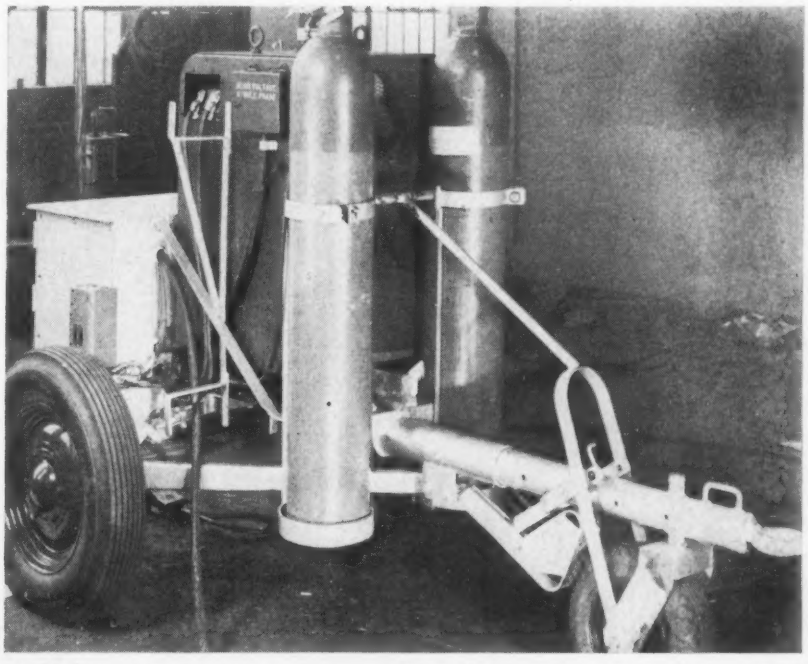
Accuracy of stock feed at these high speeds, frequently without the use of pilot pins in the dies, is a mechanical marvel. The feed roll mechanism can be used to feed stock continuously or in cases where pilot pins are used for extreme accuracy (generally, in progressive dies), the rolls may be "cracked" at any point in the cycle so that the stock may be carried through either entirely or in part by the die members themselves. For ease of handling stock for the setup or die tryout, the feed rolls may be "cracked" manually by means of a conveniently placed hand lever.

Feed roll mechanisms are set up on both sides of the press. Either or both of these assemblies may be engaged, disengaged or quickly removed according to the requirements of the job.

Positive Feed Drive: Drive of the feeding mechanism is positive by means of a gear train. Feed roll speeds (stock feeds) are adjustable, with over 5000 changes possible. Easily accessible, "pick-off" gears similar to those commonly used on lathes, are simply changed. Feed gear changes are indicated by a directional chart and formula supplied with the press.

Feed rolls are hardened keyed bushings (modified drill jig bushings) and

(*Please turn to Page* 134)



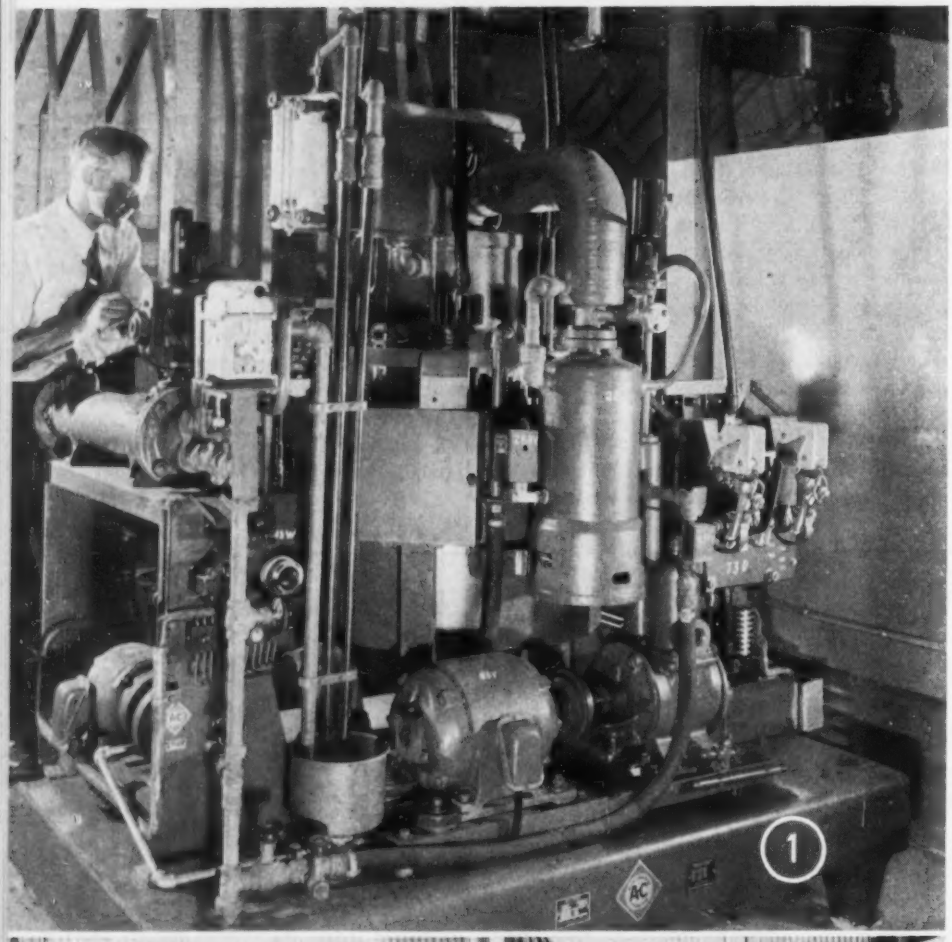
WELDER ON WHEELS: Inert gas arc welding of aluminum took to wheels on this portable unit built to speed experimental and instructional work at Aluminum Co. of America, Pittsburgh. The 3-wheel carrier is equipped with welding transformer, cylinders of argon gas and connections for water and drain lines. Torch leads 25 ft long, with a 50-ft extension permit welding in nearly inaccessible places

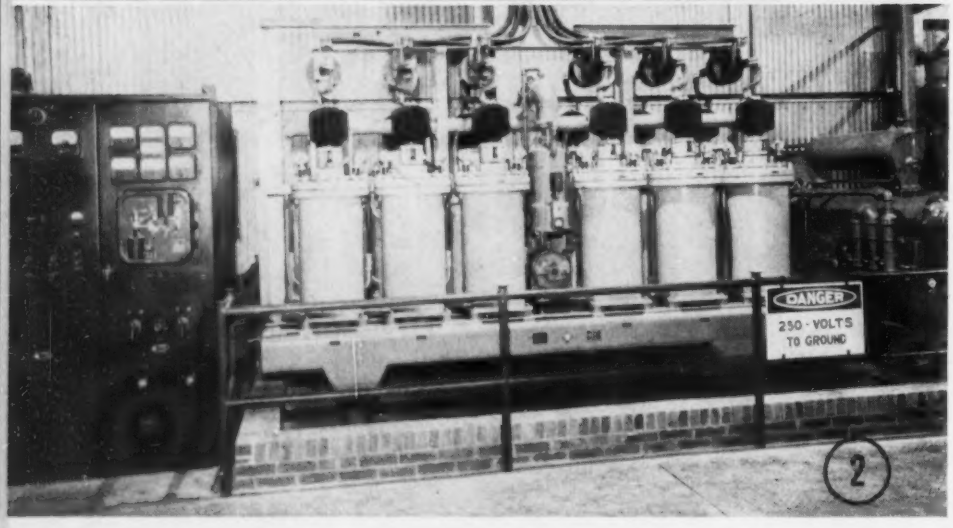
Steel Plant and Foundry Application of

Mercury Arc Rectifiers

By S. R. DURAND
Application Engineer
Allis-Chalmers Mfg. Co.
Milwaukee

Introduction of unit substation assemblies permits location where greatest economies can be effected in direct-current power distribution. Important factors are involved in selecting rectifiers. Equipment permits interconnection of power systems and regulates flow of power in either direction





STEEL-TANK mercury arc rectifiers in the United States were first used commercially in 1925 for supplying direct current power to electric traction systems. A few years later, installations were made for large office buildings, industrial plants, mines, and electrochemical plants. But it was not until 1936 that an initial installation of a high-capacity rectifier was made in a steel mill.

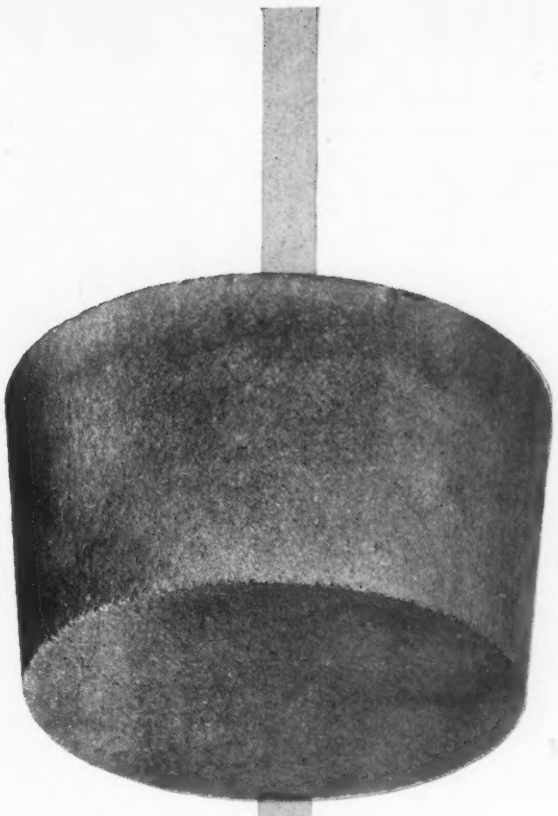
In the last 10 years, rectifiers have been installed in many steel plants and foundries for converting alternating current power into 250-v dc power. Mercury arc converters are also being used for supplying 600-v, dc power to motor drives, for interconnecting 25 and 60-cycle power systems with static type frequency changing equipment, and for converting 3-phase, 60-cycle power into single-phase, 1000-cycle power for induction melting. This type of electronic conversion equipment is also being developed for induction heating for forging, annealing, and other steel processing applications, so that mercury arc electronic power conversion equipment is becoming of increasing value to the steel industry today.

Early commercial steel-tank rectifiers were of the multi-anode type. Shortly after the first high-capacity rectifier[a] in the United States was installed in 1936 for supplying 250-v dc power in a steel mill, the development of single-anode rectifiers of the ignitron and excitron[b] types became the most important factor influencing the rapid adoption of rectifiers for 250-v, dc applications. Voltages loss in the arc was lowered by several volts resulting in an improvement in efficiency

Fig. 1—300-kw mercury arc frequency converter unit in an alloy steel foundry

Fig. 2—Typical excitron rectifier installation in a steel mill with water-to-water heat exchanger and control cubicle equipped with automatic grid control voltage regulator

Everything you want in a CARBON Mold Plug



"NATIONAL" CARBON MOLD PLUGS have a number of advantages not found in plugs made from other materials. They last longer . . . help to produce better ingots . . . and improve operating efficiency. Here's why:

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NOW AVAILABLE — Any size carbon plug can be made. Several sizes are ready for immediate shipment.

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of approximately 3 per cent for a single-anode rectifier installation in comparison to the multianode type. The full-load overall efficiency of an excitron rectifier is also, in general, 2 to 3 per cent better than that of a motor-generator set of equivalent rating, and the half-load and quarter-load efficiencies are usually about 6 to 12 per cent higher, respectively, so that the single-anode rectifier became the most efficient type of conversion equipment for obtaining 250-v, dc power.

A typical steel mill single-anode excitron rectifier is shown in Fig. 2. More than 30,000 kw of excitron rectifiers of this type have been purchased for 250-v steel mill service. In general, units of 750-kw (3000 amp at 250 v, dc) and higher ratings are of the continuously-pumped type whereas units up to 500 kw (2000 amp at 250 v, dc) are usually equipped with sealed-off single-anode tubes at the present time.

Some of the principal advantages of single-anode rectifiers which have influenced their adoption in recent years for 250-v, dc steel mill service are the following:

1. Relatively constant overall efficiency of approximately 91 per cent between one-quarter load and full load, resulting in substantial power cost savings in comparison to an efficiency of less than 80 to 90 per cent for motor-generator sets in the same load range.
2. Ability to withstand heavy momentary overloads without damage.
3. Maintenance costs, in general, considerably less than for motor-generator sets, often being only about half.
4. No-load and light-load losses from one-fifth to one-third those of rotating units, thus making rectifiers particularly suitable where long no-load or light-load periods prevail.
5. Weight and indoor space requirements considerably less than for motor-generator sets, and heavy foundations to withstand vibration not needed.
6. Water-cooled, indoor rectifier units and self-cooled, oil-insulated transformers generally located outdoors, not subject to rapid deterioration where bad dust or corrosive gas conditions prevail in the atmosphere, and do not require expensive air-filtering and air-ventilating equipment.

Other factors which are often of importance in selecting rectifiers for steel plants and foundries are that they can be quickly and easily started and stopped with push-button control and do not require synchronizing, they remain in operation during severe alternating current line disturbances, they have no principal operating parts subject to wear or requiring frequent attention, and they are practically noiseless in operation.

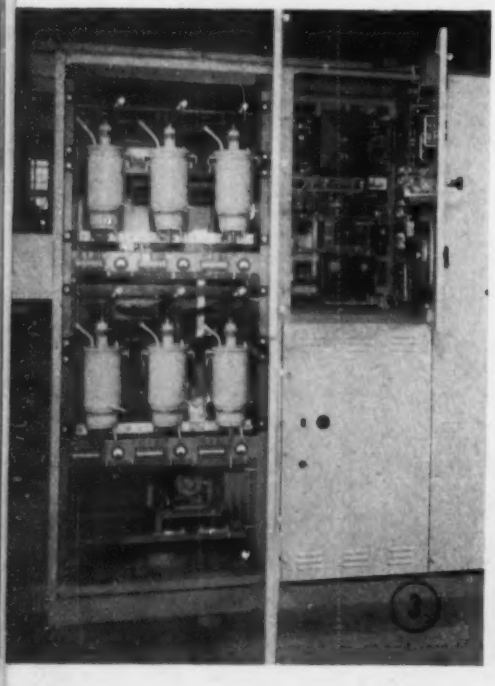
Some of the disadvantages of rectifiers in comparison to motor-generator sets are that they operate at a lagging power factor of about 93 per cent whereas a motor-generator with synchronous motor may be operated at unity or corrective leading power factor, alternating current power line voltage variations affect the direct current output voltage so that to maintain a constant voltage automatic phase-control voltage regulation is often required at some additional lowering of the power factor, distortion of alternating current voltage and current wave shapes occasionally causes increase of noise in telephone circuits where bad exposures between power and telephone lines exist, rectifiers are not suitable for regenerative braking except when specially designed and applied for such service, and the inherent arc drop of the order of 15 v results in high-capacity mercury arc rectifiers rarely being suitable from an efficiency standpoint for less than 250 v, dc service.

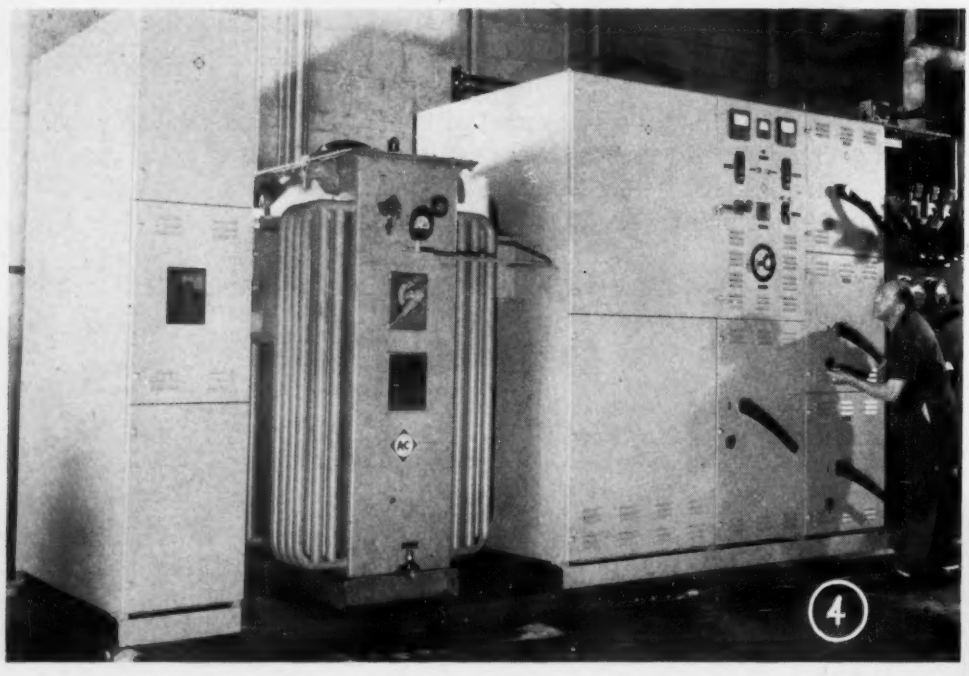
One of the important and most recent advances in the design of rectifier equipment has been the introduction of unit substation assemblies for converting alternating into direct current power. A typical unit of this type is shown in Fig. 4, and consists of the alternating current line breaker throat-connected to the rectifier transformer which in turn is throat-connected to the rectifier tube compartment and direct current switchgear. There are no bushings or electrical circuits exposed in this type of assembly so that the unit can be safely located at the load center in a steel plant or foundry where the greatest economies can be affected in distributing direct current power. The direct current switchgear includes a main circuit breaker with reverse current protective relays, and usually several smaller direct current distribution circuit breakers for each of the required direct current circuits. The alternating current switchgear is of the metal-clad type and selected for the required voltage and current interrupting capacity requirements prevailing on the alternating current supply system.

Fig. 3 shows the mounting of the six sealed-off rectifier tubes in the tube compartment. In the back part of this section is located the water-cooling apparatus including automatic temperature regulating devices. The ignition-excitation control equipment for the excitron

Fig. 3—Assembly of sealed excitron tubes and ignition excitation equipment in cubicle for direct current unit substation

Fig. 4—Load-center type direct-current unit substation using sealed-excitron rectifier tubes





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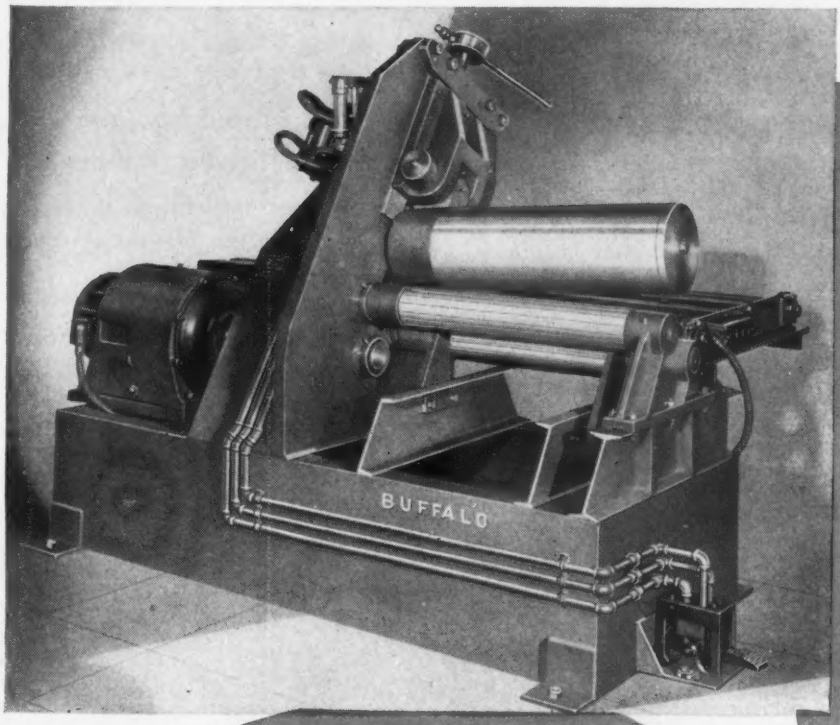

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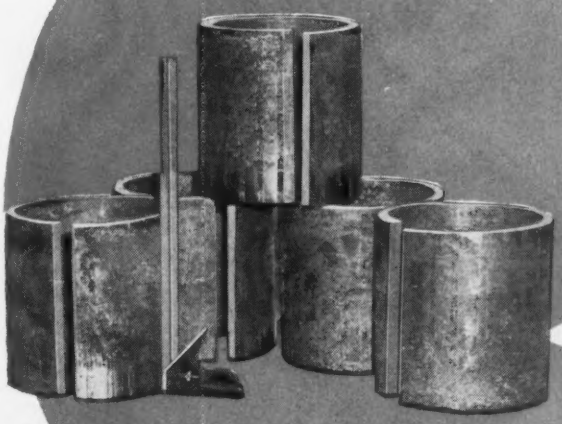

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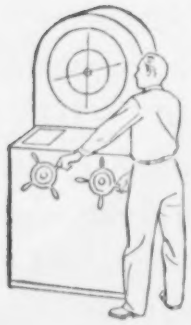

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Your need in steel tubes may be wholly different from this application but whatever your requirements in carbon, alloy, stainless (seamless or *Gloweld* welded) and high purity ingot iron (*Globeiron*) tubes — look to Globe as a specialized, dependable source of supply. Globe engineers and technicians gladly cooperate to help you find exactly the tubing you need for even the most unusual application. Globe Steel Tubes Co., Milwaukee 4, Wisconsin.

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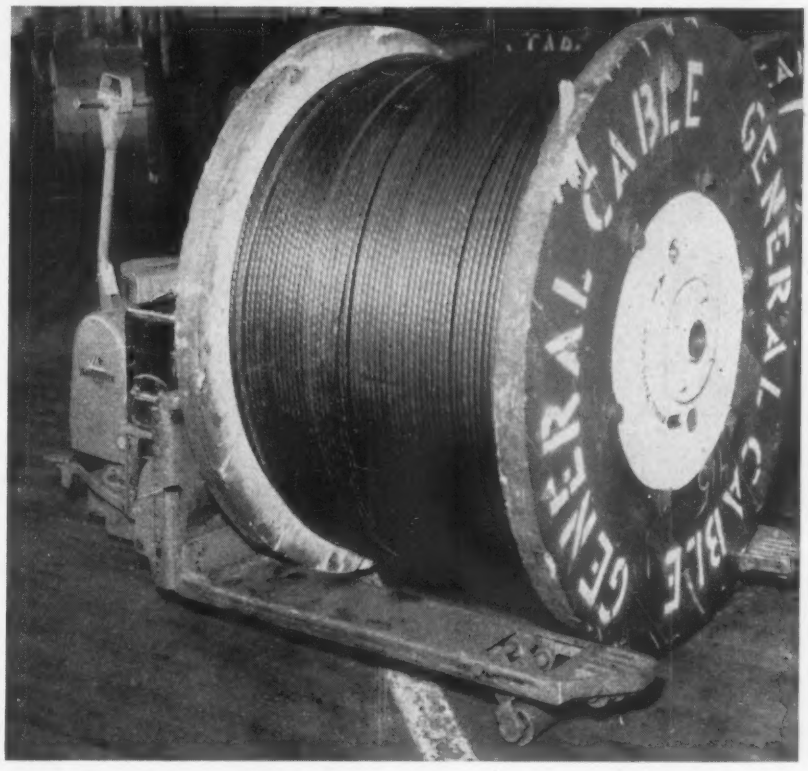
tubes and the grid-control voltage regulating and metering equipment is assembled in the upper part of the adjacent compartment as seen in the picture, the lower part of this compartment being available for the main direct current circuit breaker.

The sealed-off mercury pool excitron tubes are sold on a warranty policy basis, the usual type of policy including a prorata adjustment if a service life of three years is not attained during normal operation of a tube. Rectifiers for industrial service are rated for full-load continuously, 125 per cent full-load for 2 hours, and 200 per cent of full-load operation for 1 min.

Grid Control of Arcs

Since 1940, mercury arc converters have been developed for use as highly efficient frequency changers in steel mills and foundries. These applications have become possible through the development of grid-control for initiating and accurately timing the firing of the arcs between the graphite anodes and mercury pool cathodes of mercury arc tanks. In large steel mills, it thus becomes possible to interconnect 25 and 60-cycle power systems and regulate the flow of power in either direction through the mercury arc rectifier-inverter equipment. This type of static frequency changer is of particular value for steel mill service where it would be extremely difficult to maintain the frequency of a 25-cycle system within sufficiently close limits for reliable operation of rotating type frequency changing equipment.

The basic frequency changing circuit[3] being used at present in installations of several thousand kilowatts capacity in the United States consists in first rectifying the 3-phase alternating current power of one system to high voltage direct current power which is then applied to a mercury arc inverter unit with associated transformer connected to the other system in such a manner that power can be made to flow into that system. The amount of power exchanged between the two systems can be regulated by switchboard equipment through phase-control of the mercury arc units, either by means of manual adjustment or an automatic regulator. The mercury arc inverter unit is essentially a high-speed electronic commutating device which under proper phase-control of the arcs causes currents to flow sequentially through its transformer windings in such a manner that power flow in the proper direction can be established. Both the rectifier and inverter units depend upon the alternating current systems to which they are connected for their reactive kva requirements because only kilowatt power can be transferred through the high-voltage direct current link.



REEL CARRIER: Finished cable on reels 54 in. diameter and 38 in. wide are handled by this special model battery-powered pallet truck in the plant of General Cable Co., New York. Manufactured by Automatic Transportation Co., Chicago, the truck is a modified version of the 4000-lb load capacity Transporter. Forks 45 in. wide at the outside are engineered to straddle the reel when in lowered position and to lift it from the floor

Another type of mercury arc frequency changing application[4] has been developed for steel mills and foundries for induction melting of alloy steels. A frequency of the order of 1000 cycles per sec is required to accomplish efficient melting of all types of scrap material in induction furnaces, and mercury arc converters have been developed as the most efficient type of frequency changer to convert 60-cycle power into kilocycle power. Installations already made and projected today are of 300-kw output rating for melting about 1000 lb of steel per hour. Furnaces range in size from 200 to 2000 lb capacity of molten metal.

Another use of kilocycle power has been for holding molten steel at pouring temperature over a long period of time in a large induction heated ladle. Where many small castings must be made, equipment of this nature helps to attain important economies by providing for better utilization of arc furnaces. Molten metal can be transferred from an arc furnace immediately after completion of a melt to an induction heated pouring ladle, and the arc furnace can be replaced in service to produce the next melt while the induction heated ladle is being used to raise and hold the molten metal at the desired pouring temperature for production of castings.

A 60/1000-cycle mercury arc frequency converter operates effectively as a high-speed electronic switch to convert 3-phase, 60-cycle power into single-phase, kilocycle power.[5] Transfer of arc current between phases of a high-frequency transformer supplying power to the furnace coil is controlled by the grids of the mercury arc unit, and the frequency automatically adapts itself at all times to the requirements of the furnace circuit. The inherent arc drop loss of about 15 v will represent less than a 1 per cent loss by designing for operation at about 2000 v; this voltage, however, for operation of the mercury arc unit, does not influence the choice of power line or furnace voltage because 60-cycle power can be supplied through a 3-pole circuit breaker and transformer at any available line voltage, and kilocycle power is furnished to the furnace coil through a high-frequency transformer, the winding ratio of which can be chosen for most efficient use of this power. Fig. 1 shows a 300-kw mercury arc converter unit assembled on a frame with its automatic vacuum pumping and heat-exchanger water cooling equipment.

Development of single-anode continu-

(*Please turn to Page* 136)

Highway Trailer Trips Doubled by

EFFICIENT UNIT LOADING

CUTTING of loading and unloading time from 360 man-minutes per handling operation to 46 man-minutes—a saving in time of 87 per cent—was the experience of Electric Storage Battery Co., Philadelphia, in experimenting with improved materials handling techniques and equipment as a means of improving operations of its 12-ton highway trailers. In addition, the availability of the trailer per shift has been doubled, the company found.

Increased productivity of men and trailers was brought about by handling materials in unit loads on 40 x 80-in. pallets, dimensioned to conform with the size of the trailer body. Palletized unit loads are handled by electric fork trucks outside the trailer, on wheel type conveyors inside the trailer. By eliminating piece-by-piece manual handling, the operator of a battery powered fork truck and one worker inside the trailer handle as much as four men using manual methods in one-quarter of the time—23 min per operation, as against 90 min.

The short lengths of conveyor (seen on trailer floor) are held in position by flat wooden strips which do not interfere with quick removal of conveyor equipment when the trailer is used for transporting nonpalletizable materials. Equipment used permits the electric truck, working from either platform or ground level, to set a double pallet load of bags, barrels, boxes or bales onto one of the trailer conveyor lines. From this point the man in the trailer pushes the pallet loads into position in the trailer.

With two men requiring 23 min to load the trailer, 46 man-minutes are consumed. Four men doing the same job would require an average of 360 man-minutes, the company estimates, resulting in a saving per handling operation of 315 man-minutes, or 10.5 man-hours.

Use of six skids on each of the two conveyor lines results in a reasonably tight coverage of the floor area, consequently load shifting in transit is negligible.

The company reports that the palletizing of high trailer shipments has saved enough time in each handling operation to enable the trailers to make four round trips per day between plants.

Combination of palletized unit loads, battery powered fork trucks and conveyors has accomplished four objectives for the Philadelphia company: Speeding the flow of materials between its two plants; increased productivity per man-hour; increased availability of highway trailer equipment; and lowered nonproductive handling costs—a large part of all production costs.

Mine Power System Displayed at Exposition

Supplied as an integrated "power package," a fully co-ordinated power distribution system, including a substation for stepping down voltage used by electric shovels, grounding resistor, cable, connection boxes and transformers, all engineered for coal stripping operations, was featured by General Electric Co. at the Coal Convention and Exposition in Cleveland recently.

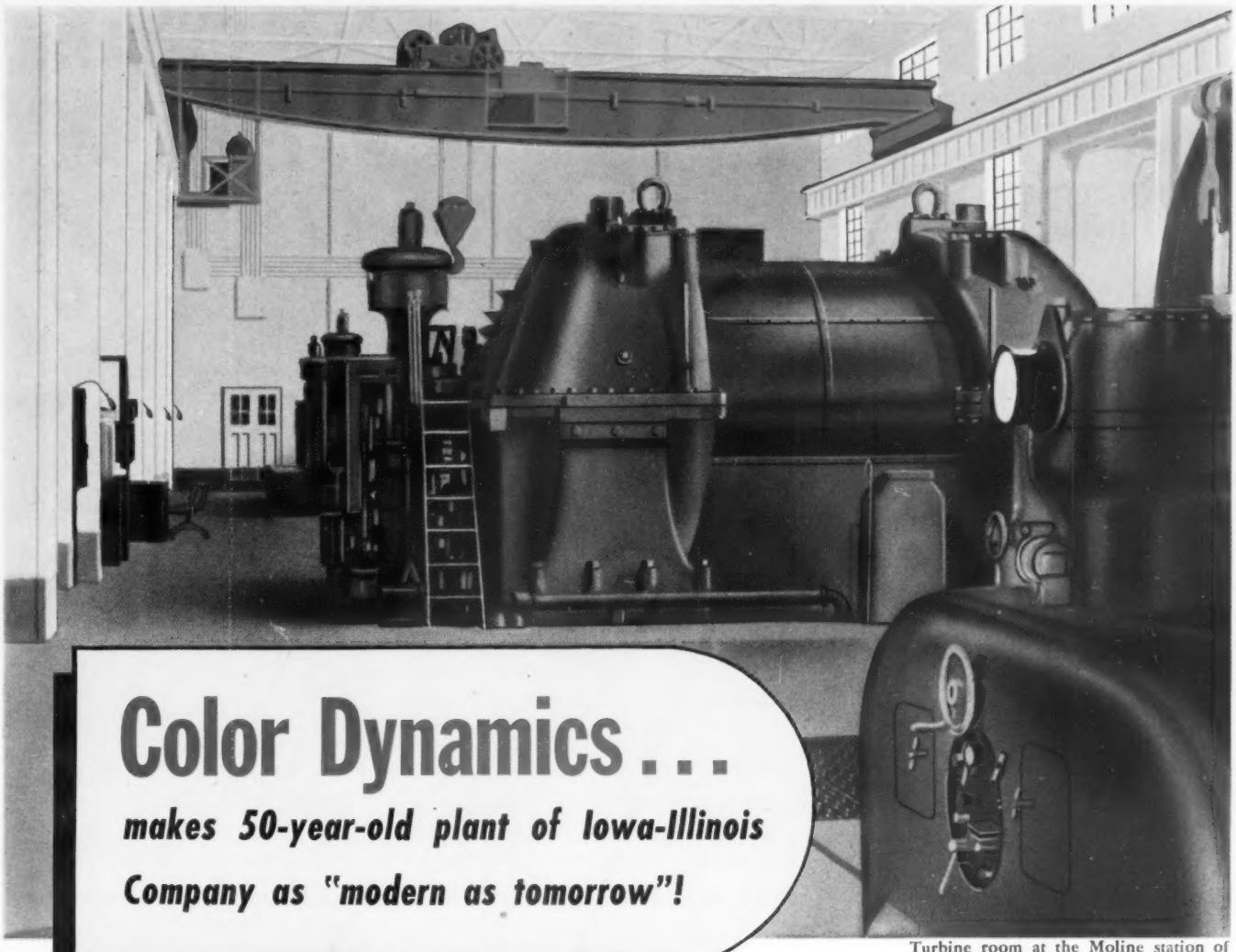
Said by the company to provide speed, flexibility and safety in the working of strip mines, the use of a single feeder unit substation mounted on skids greatly facilitates the overall stripping operations, as the unit is moved easily from one place to another.

Such a unit eliminates the necessity of tearing down a field assembled station and reassembling at another point, the savings being largely in mining time and electricians' wages. Cable-skids with circuit breakers with overcurrent and ground fault protection are built to give a high degree of portability and convenience, it is stated. Lateral or trunk lines cables may be quickly connected and disconnected.

Trunk line power cable rated at 5000 v has excellent resistance to aging, impact and abrasion, GE states. Type Sh-D, made by the company, is reported to be difficult to kink permanently and may be handled on reels or on the ground. Coupling and uncoupling may be facilitated with a 2200 v cable plug, according to the company.

Steel Die Sets Offered

Steel die sets in all sizes are available for immediate shipment from Standard Machinery Co., Providence, R.I., which reports that they may be supplied for all presses, eliminating the expense of setting up the dies every time a job is repeated. All parts are said to be ground and bored to close limits, die shoes, punch holders, pins and bushings being fully interchangeable from stock without rework or fitting.



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Turbine room at the Moline station of the Iowa-Illinois Gas & Electric Company

BY ACTUAL experience with Pittsburgh's COLOR DYNAMICS, production executives are finding that color properly "engineered" on walls, floors, ceilings and machines helps to maintain quality and quantity of production.

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"Since repainting according to the principles of COLOR DYNAMICS, the turbine room of this 50-year-old station looks as up-to-date as though it had just been constructed. For better lighting we used Light Cream on ceiling, skylight areas, trusses and upper walls. Lower walls were painted in Sea Foam Green for its eye-rest qualities. Light Grey was used on the floors. Turbines, generators, pumps and auxiliary equipment were painted Vista Green.

"Turbine hand wheels, valve wheels, operating levers, switch boxes and other points to which the operators' attention must be quickly attracted were painted in bright Orange. Further to reduce accident hazards, we made the travelling crane more conspicuous by painting it in Orange.

"Our employees are unanimous in preferring the present colors. They work more efficiently, more cheerfully, with less fatigue and greater safety.

"Although the job was done more than a year ago, there is no evidence so far that these lighter colors will require repainting more often than the greys and blacks we had formerly used."

Why not try COLOR DYNAMICS in your plant—on a machine or two or in one department? A request on your company's letterhead will bring you a FREE copy of our new and enlarged booklet which explains the principles of COLOR DYNAMICS and suggests many practical applications. Pittsburgh Plate Glass Co., Paint Division, Dept. ST-7, Pittsburgh, Pa.

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LAVAX PBX ENAMEL—for woodwork, furniture or metal trim. Brushes out to a smooth, satin finish that resists marring and abrasion.

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6 REASONS WHY A BLANCHARD

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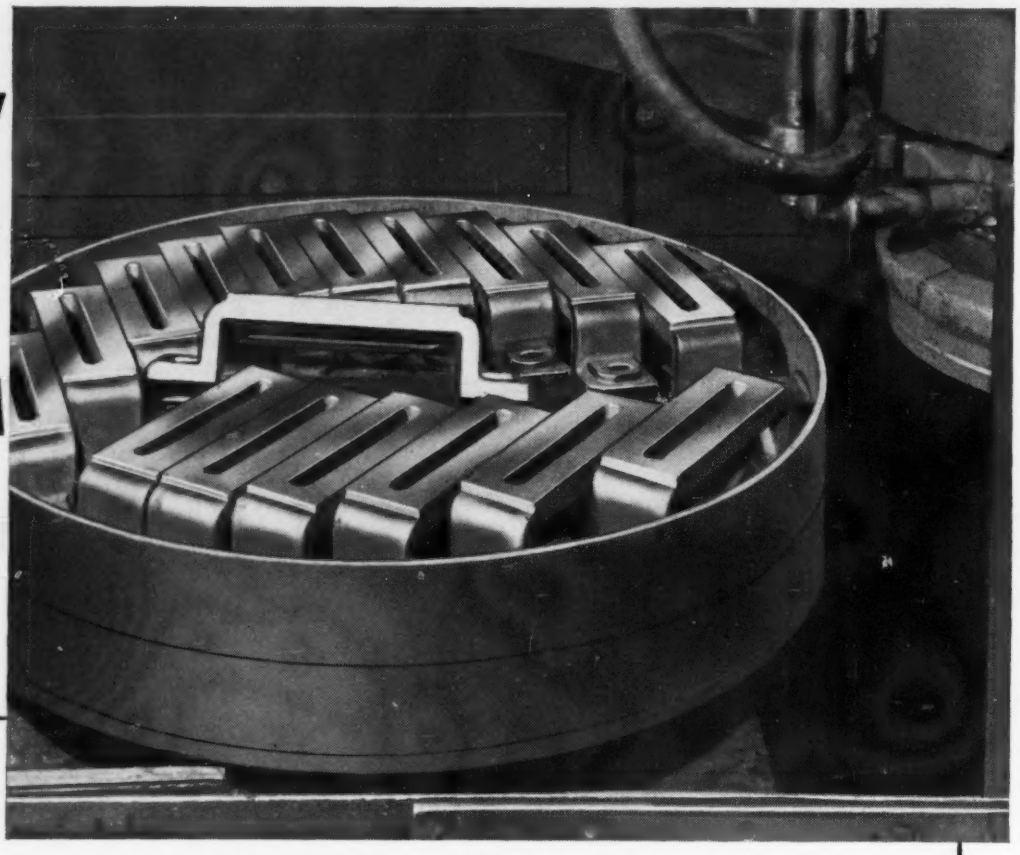

THE JOB...

● The illustration shows 17 doffer drawing pulley brackets being held on a 36-inch chuck of a No. 18 Blanchard Surface Grinder. Material is cast iron. Rough size $15\frac{3}{8}''$ x $3\frac{1}{2}''$ x $3\frac{3}{4}''$. Two sides—the top and the feet—are ground, in two operations, to make the height $3\frac{7}{16}''$. Commercial finish required.

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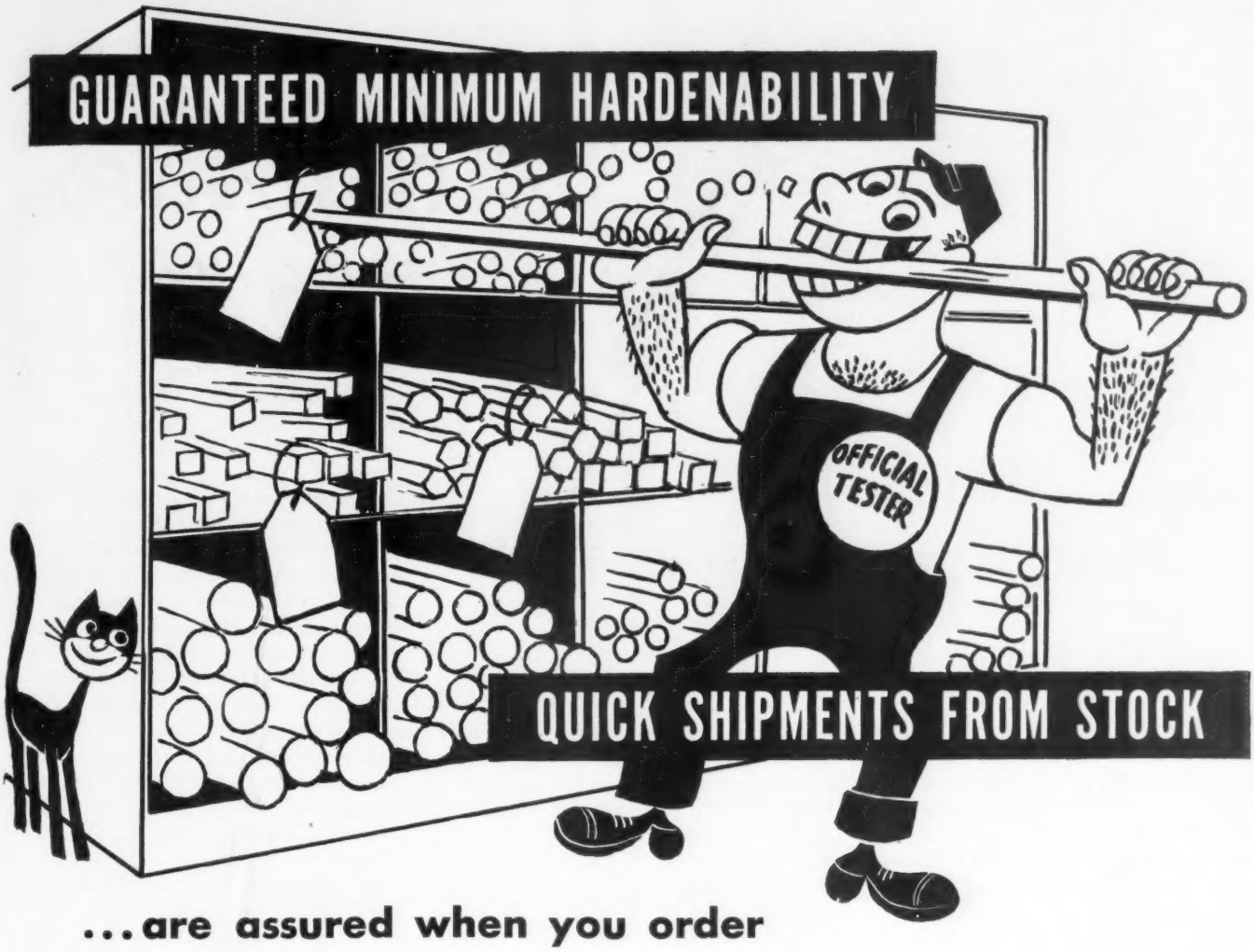

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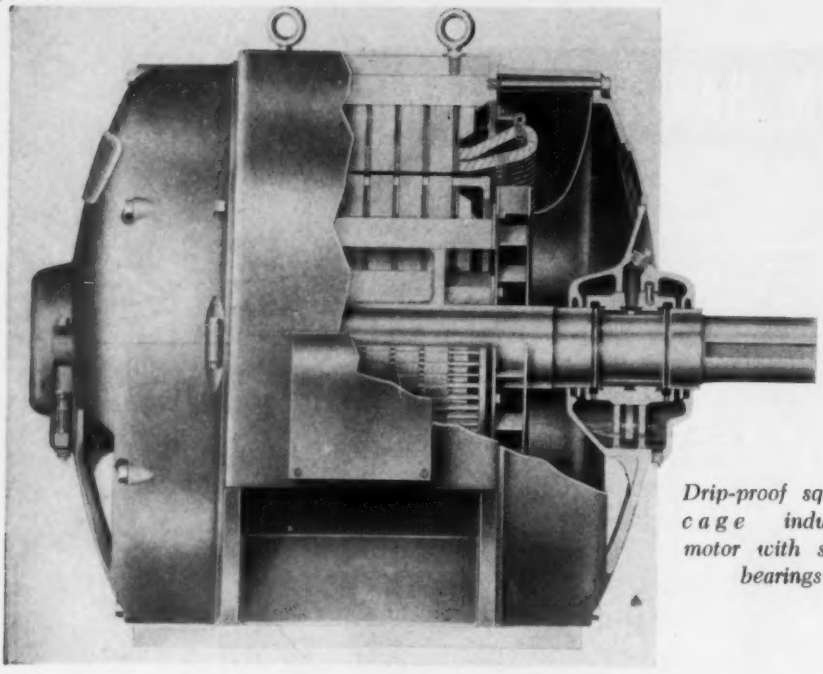
UNITED STATES STEEL



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Protective Construction

For Modern Motors

VULNERABILITY of electric motors used in industry is mechanical, chemical, thermal or electrical in nature. In the past, most motor builders centered attention on improving performance characteristics under normal operating conditions, with less attention being given to the problem of protecting the motor against damage from external causes.

Except for extremely dirty, hazardous or outdoor locations, the drip-proof or splash-proof motor will usually satisfy external protection requirements. According to E. H. Jernberg, mechanical design engineer, Electric Machinery Mfg. Co., Minneapolis, this construction is now recommended to protect the motor where it is subject to falling, dirt, liquids or splashing. The additional cost of drip or splash-proof protection is said to be well justified by the reduced maintenance it affords in guarding the internal motor parts against external damage, and by greater reliability to offset the ever-increasing cost of down-time.

Appearance of modern splash-proof synchronous motors enhanced and cleaning is easier in comparison with results obtained by the former practice of "modifying" a standard open motor with shields and baffles. Frame fabrication by welding permits extra strength with reduced weight, and packs more horsepower into a given volume.

Internally, improved design and methods favorably affect the ratio of size and weight to horsepower. The squirrel-cage winding illustrated in the accompanying photograph is connected at the ends by means of phos-copper braze-welding, a modern method of permanizing torque characteristics. New studies of air flow have resulted in the use of parabolic or other curved baffles to direct the air in a smoother path for reduction of turbulence and noise. Progress in bearing manufacture has minimized trouble from this, one of the biggest maintenance problems encountered with squirrel-cage induction motors.

Sleeve bearings employing the modern 1 to 1 ratio of diameter to length are less subject to wear resulting from shaft deflection. The short bearing permits a decrease in housing size, reducing restrictions to the flow of air through the machine.

Welding Changes Increase Trailer Production

Operating costs were reduced 30 per cent and a 50 per cent saving in plant floor space effected with the installation of alternating current arc welding equipment for the fabrication of large haul away automobile trailers at the trailer division of Whitehead & Kales Co., Detroit, it is reported.

Conversion to this new equipment which allowed the operator to weld in any position, eliminated "roll-overs" during final welds, making jigs unnecessary and saving floor space. A continuous and uninterrupted production line on which subassemblies are welded together also was made possible. Result is that now one trailer may be turned out every hour.

As a safety precaution, the company has installed voltage controls, made by General Electric Co., Schenectady, N. Y., on all of their welding machines. When welders are idling, the control disconnects them from the line and removes all but the control circuit voltage (about 30 v) from the welding leads.

Trailers of this type are welded throughout with the exception of side sheets, which are riveted into place. All types of welds are made, including overhead fillet, overhead butt, vertical up, vertical down and flat.

Cemented Carbide Rod Available from Stock

Lengths of solid cemented carbide rods, unground and in both random and specific lengths, are available from stock from Carboloy Co. Inc., Detroit. Fifteen standard diameters, ranging from 1/64 to 3/8-in. with stock allowance on the diameter from 0.007 to 0.012-in. on the smallest size to 0.022 to 0.050-in. on the largest size are offered.

Random lengths furnished will vary from 4 to 12 in., the company states, but with sufficient extra stock to compensate for any rough ends. A slight charge is made per piece when the rod is cut to specified lengths up to 12 in.

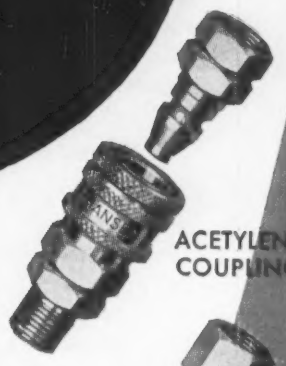
Colorimetric Procedure Described in German Paper

A colorimetric procedure using sulfosalicylic acid serves to avoid serious time loss in the determination of iron in light metals, according to a report published by Office of Technical Services, Department of Commerce, Washington, and translated from a German research paper. This test gives reproducible values in the presence of almost all the possible alloy elements and impurities, it is reported.

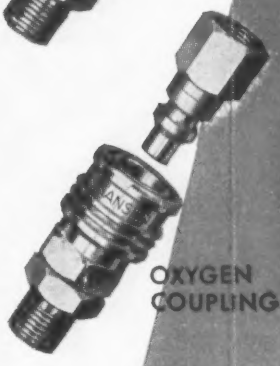
Analysis time is shortened, using the colorimetric method, by avoiding the separation of iron as required in the process of titrating ferrous ions with permanganate. The sulfosalicylic acid test is said to work satisfactorily in the presence of aluminum, magnesium, silicon, copper, zinc, lead, cadmium, antimony and manganese.

The report, PB-53890, includes a diagram of the test procedure, calibration charts and tables showing typical test results.

HANSEN *Couplings*
Are Used On a VARIETY of JOBS



ACETYLENE COUPLING



OXYGEN COUPLING

EACH DAY a new use is found for Hansen couplings, proving their adaptability, versatility and right design. Hansen couplings have made their mark in many fields and their long list of accomplishments is growing longer each day.

There is a specific Hansen coupling made for air, oil, grease, oxygen, and acetylene, and they come in a wide range of standard sizes.

Hansen couplings are simple and easy to operate — merely push plug into socket, coupling is connected and locked — slide sleeve back with thumb, coupling is unlocked and disconnected. Hansen couplings are rugged, with all moving parts fully protected, consequently they will stand up under rough usage. Complete swivel action prevents kinking of hose. They can be readily incorporated in new or existing equipment.

Our representatives will be glad to discuss with your engineers the possibilities and many advantages of Hansen couplings. Send for illustrated catalog.

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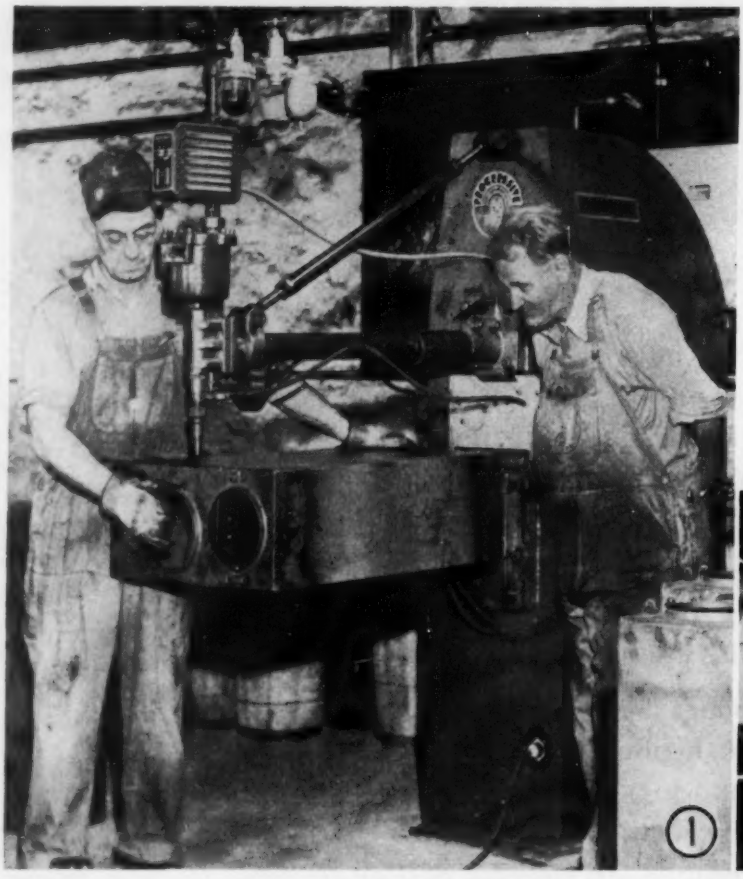
337. Increase

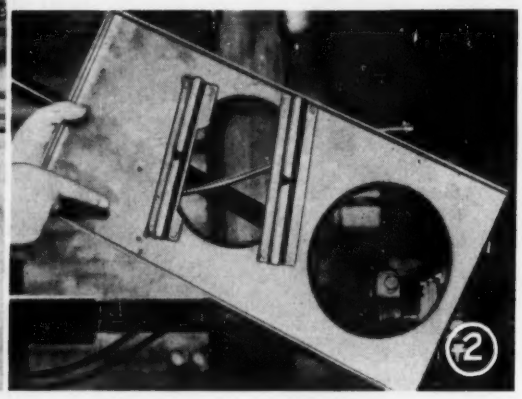
. . . in production of oil dispensing tanks follows adoption of different joining method



REDUCTION of 25 per cent in overall production time of oil dispensing tanks for gasoline filling stations through the use of a single 75-kva pedestal spot welder was reported recently by Hollister Whitney Co., Quincy, Ill. The welder, manufactured by Progressive Welder Co., Detroit, is said to have enabled the company to step up output 33 per cent without requiring skilled labor to operate the machine.

Photo at left illustrates the welding of top to the tank body. Material used is 16 gage hot-rolled steel, not cleaned prior to welding. Lower photo shows inside top of tank showing stiffeners welded inside tank. Here especially, surface marking is undesirable, since one of the product requirements is that exterior surfaces should present a smooth appearance when completed.

The machine operates on 220 v 60 cycle supply. It has a throat depth of 48 in., and a special rectangular lower arm to accommodate shape of tanks. The upper arm is braced from the machine column, eliminating deflection in arms during welding, despite machine's relatively deep throat.



Tool Slipping From Hammer Prevented by New Invention

Primarily intended for use with power operated hammers to prevent the tool from slipping out of the hammer, a recently patented tool retainer, invented by Anthony J. Calaman, Oswego, N. Y., is said to be conveniently operable for securing and releasing the tool. Composed of few parts, it is attached to the outside of common types of existing hammers or it may be attached to new hammers by threaded connections to the lower ends of stud bolts which carry absorber springs.

Pivoted L-shaped arm of attachment may be swung into and out of tool retaining position; provision is made for latching and unlatching the horizontal free end of the arm. Assigned patent No. 2,406,132, the device's horizontal portion of the arm has a semihexagonal notch betwen its ends for engaging the exposed surface of the tool directly below an annular flange so that the flange rests on the arm.

Automatic Brake Release Patented

An automatic release mechanism whereby the emergency brake of an automobile is released by depressing the accelerator pedal when the ignition switch is on, has been assigned patent number 2,411,632 by the United States Patent Office, Washington.

Invented by Harold Moran, Lincoln Park, N. J., the device prevents depressing of accelerator pedal when ignition switch is off, a pivoted lever, actuated by the pedal, being normally latched to prevent it from pivoting. A solenoid unlatches the lever when the ignition is turned on.

ASTE Adopts Numerical Classification Index

Speed in the systematic location of specific data, simplification of comparing vendor specifications and design and aid to the tool engineer in selecting the product best suited for his requirements are benefits to be derived from the new numerical classification system for standards that has been adopted recently by American Society of Tool Engineers, Detroit.

Although the numbering is different, the index works in the same manner as the decimal system in universal library use. The coded numbers used in the index were derived from the U. S. Standard commodity classification system. The index itself is divided into two sections, a numerical listing and an alphabetical listing and is considered a milestone in standards progress.

MAKE 1947 PRODUCTS ON 1947 PRESSES

Radio panels, hubcaps, headlight frames, chrome stripping—gleaming automotive hardware—put the finishing touch on the new 1947 models.

With product design changing from year to year, and vast quantities of ornamental parts required, manufacturers are called upon for maximum output on the production line. Danly Presses step up production efficiency to meet this ever increasing demand, because they insure faster runs, more accurate stampings, minimum "down-time" and lower costs.

Whether it be blanking, forming, embossing, piercing, drawing or any similar operation, modern Danly Presses have the versatility, rugged construction and mechanical accuracy for quantity production at lower unit cost.

MAKE 1947 PRODUCTS ON 1947 PRESSES

This 100-ton single point model is one of a number of Danly Presses built in sizes ranging from 100 tons up. Special sizes and adaptations engineered to customer specifications.

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2100 S. 52nd Avenue • Chicago 50, Illinois

THE PRESS FOR MODERN PRODUCTION

Grinding

(*Concluded from Page 82*)

of his life redesigning the "grinding lathe" into a real precision grinding machine. The universal grinder exhibited at the Centennial Exposition at Philadelphia in 1876, which was the year of Mr. Brown's death, was a complete and practical machine—surprisingly like the universal grinders of the present day.

Various other types of precision grinding machines—including small surface grinders—followed, some of the major contributions being made by Charles H. Norton subsequent to 1886. Charles H. Norton, who died recently at an advanced age, was no relation to F. B. Norton, who died in 1885 after a brilliant career of development of vitrified grinding wheels.

F. B. Norton was a founder of the Norton Emery Wheel Co., organized about the time of his death. Charles H. Norton, who had been with Brown & Sharpe as grinding machinery engineer, in turn was one of the founders of the Norton Grinding Co., in 1900. This project was financed by men connected with the Norton Emery Wheel Co. Eventually these two Worcester, Mass., enterprises, based on the inventive genius of those two unrelated Nortons, were merged as the Norton Co., widely known today as a maker of abrasives, grinding wheels and grinding machines in wide variety.

Valued for Light "Finishing Cuts"

Although grinding machines — both cylindrical and surface—won early and wide recognition in tool rooms, gage shops and a few "super-extra" manufacturing operations demanding the exact sizing of hardened steel parts, it was almost 40 years before serious recognition was accorded to them as production machines. Certainly, during that interim period no one thought of them as "roughing out" machines. It was only on light "finishing cuts" that their value was conceded.

That was true to a considerable degree when I first worked in the shop. Over-and-above that, oldtime mechanics held to the belief that ground parts—especially cast iron—held abrasive particles in their "pores" and forever after acted as laps on mating parts in or on which they ran. That myth certainly has been lived down—especially in the automotive industry.

The thing which did for grinding machinery what high speed steel—and more recently, the cemented carbides—have done for machine tools employing blade-type tools, was the discovery of how to make artificial abrasives. One of these, carborundum, discovered by Dr. Edward G. Acheson in 1891 during electric furnace experiments, is silicon carbide, which does not occur in nature at all. About the same time, electric furnace experimentation at Ampere Electro-Chemical Co., brought forth artificial aluminum oxide in almost pure form—far superior to the natural substance known as emery.

From there on—with further discoveries as to how to grade and bond these "standardized" artificially produced abrasives, precision grinding began to get somewhere as a production process. As with high speed steel and the carbides, however, the road was long and difficult.

The makers of artificial abrasive wheels did a fine job of selling to some of the machine tool builders—who in turn bore with the wheel makers with notable patience during the years when the new wheels were in the era of "growing pains" and were rather unpredictable in their action.

Development of Coolants

Each group was of immeasurable help to the other during those days, and helping both of them were certain companies who developed coolants suitable for production grinding operations.

Then the grinding machine makers went out and did a magnificent selling job with machine tool users—and what with all the myths derogatory to grinding as a production process—that certainly was no easy job either. Among their first converts to grinding as a "metal removing" process were makers of rolls which were too hard to machine with tools. Having gotten a foot in the door in that field, they managed to extend the process to details such as cam drums. Not until after the first World War, however, did grinding gain a solid foothold in production—and that to no small degree was due to its fine record on war production.

As an old "automatic" man, I don't pretend to be an all-out authority on production and precision grinding machinery. Therefore, I had to turn to the book for a checkup on where we stand today in this matter of grinding machines. Believe it or not, I found that there now are in the neighborhood of 60 different types of grinding machines. I don't mean simply that there are 60 different trade names—I mean that there are 60 different types. Obviously that is too much ground even to begin to cover in an article such as this. Therefore, I simply hit a few high spots.

For instance, the illustration at the upper left hand corner of the two-page spread at the beginning of the story, is of one of the Landis Tool Company's plain hydraulic grinders designed with particular attention to convenience of operation and general good looks. The operator either can stand up or sit down as he chooses. The kneehole recessed into the box bed makes this possible, and controls all are within easy reach.

The photograph immediately below that one gives some idea of the big way in which surface grinding has taken hold on large operations. In this case a number of steel parts have been "ganged up" on a large magnetic chuck. Similar machines even larger in size are used extensively in machining slides and beds of machine tools. One advantage of a grinding wheel, incidentally, is that it cuts both ways on a job such as this.

The photograph to the right of those two, on the same page, brings us back again into the tool room. This shows a Moore jig grinder—a close relative of the jig boring machines mentioned in a previous article on "Boring"—finishing holes in a hardened steel die. The small, high speed grinding wheel corrects any inequalities in size, shape and to some degree of location, of "jig bored" holes —inequalities often introduced in hardening and tempering operations.

Over in the upper right hand corner of the right hand page of the spread, is a heavy duty cylindrical grinder doing a job which in years gone by would have been a "tough" lathe job. This is an alloy steel armature shaft for a 250 hp Westinghouse motor for a diesel-electric locomotive. This is typical of the run-of-the-mill jobs which today are done by grinding without giving them a second thought.

Advancement in Hole Grinding

Hole grinding originally was confined to such work as finishing ring gages. It is indeed a far cry from that to the sort of thing which can be done in the big Bryant internal, chucking grinder illustrated on the third page of this article. This machine has maximum swing of 60 in., and will grind a hole 14 in. deep. It weighs 22,000 lb which sounds like a lot of machine, but actually is much less than many big grinders weigh these days.

Remarkable things now are being done by the grinding process—such things for instance as centerless grinding of a wide variety of shapes, including billiard balls, and the centerless grinding of threads on screws. Crush dressing of wheels by forcing steel formers into their periphery is contributing heavily to progress in production form grinding. Automatically controlled diamond dressing likewise plays an important role in quick, accurate dressing of wheels to shape. In some cases it supplements crush dressing.

Modern grinding machines are outstanding in their ability to rough out work, and at the same setting to finish it within a few microinches of perfection. Machine tool designers, tool engineers and wheel makers contend that even greater things lie ahead. I believe they are right.

SAVINGS .... or are they?

REAL bargains are rare . . . you usually get about what you pay for! Forgings reduce costs at the assembly line . . . They often cost more—right off the dies—than parts made by some other method . . . but what about machining time? What about weight? What about reliability . . . guts in service? The cost sheet should be totaled only when the forged part has given all its in-bred performance . . . Erie Hammers are helping industry improve its products by producing better forgings, lower costs parts that deliver longer, safer service. Full details on Erie Steam Drop, Board Drop, Single or Double Frame Forging Hammers, Trimming Presses are yours for the asking.

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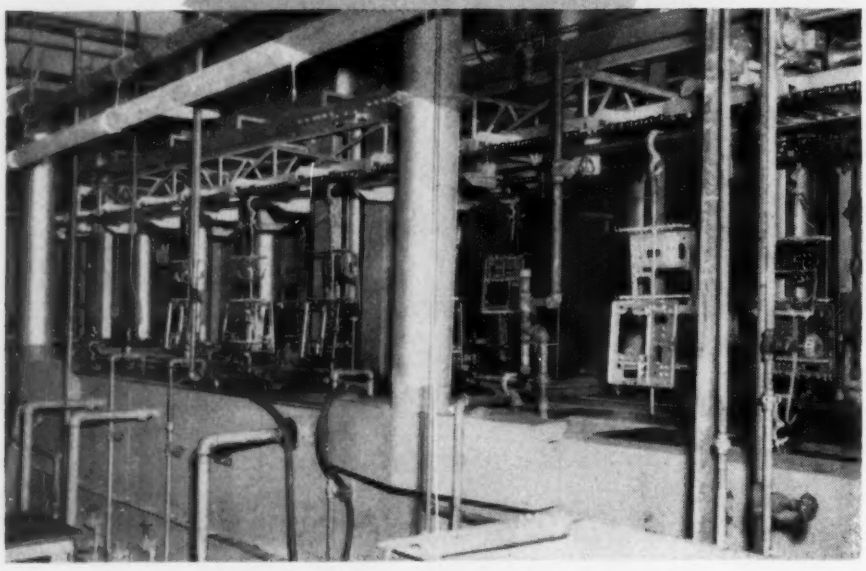
FULLY AUTOMATIC PLATING MACHINE



The plating machine installed here is the one hundredth of its kind constructed and sold within 18 months by Udylite

The Friden Calculating Machine Co. of San Leandro, California is now cadmium plating the parts for its product in this Udylite Fully Automatic Plating Machine.

Production rates are 180 large parts, bases, etc., or 6400 smaller parts per hour. The machine completes one cycle every 18 minutes during which the parts are not touched from the time they are racked until they are unloaded and ready for assembly or storage.

This machine operated by one plater is fully adjustable for any plating cycle desired. It turns out the production which previously required five hand platers. It assures uniformly plated parts and it occupies less floor space than would be required by any other method.

Udylite

THE UDYLITE CORPORATION

DETROIT 11, MICHIGAN

REPRESENTED IN PRINCIPAL CITIES

Spectrographic Equipment

(*Continued from Page* 83)

as cyanogen blurring will obscure lines in the record negative.

Normally these conditions are avoided by the provision of direct current arcing power at high voltage, 20-25,000 v. However, we desired, if possible, to avoid the use of direct current, because of the conversion equipment which would have to be added, and instead to use the available laboratory supply of alternating current power. By the addition of a magnetic coil, surrounding the carbon electrode and energized at 100 v dc, it was found that a first class arc could be obtained with 4600 v ac potential.

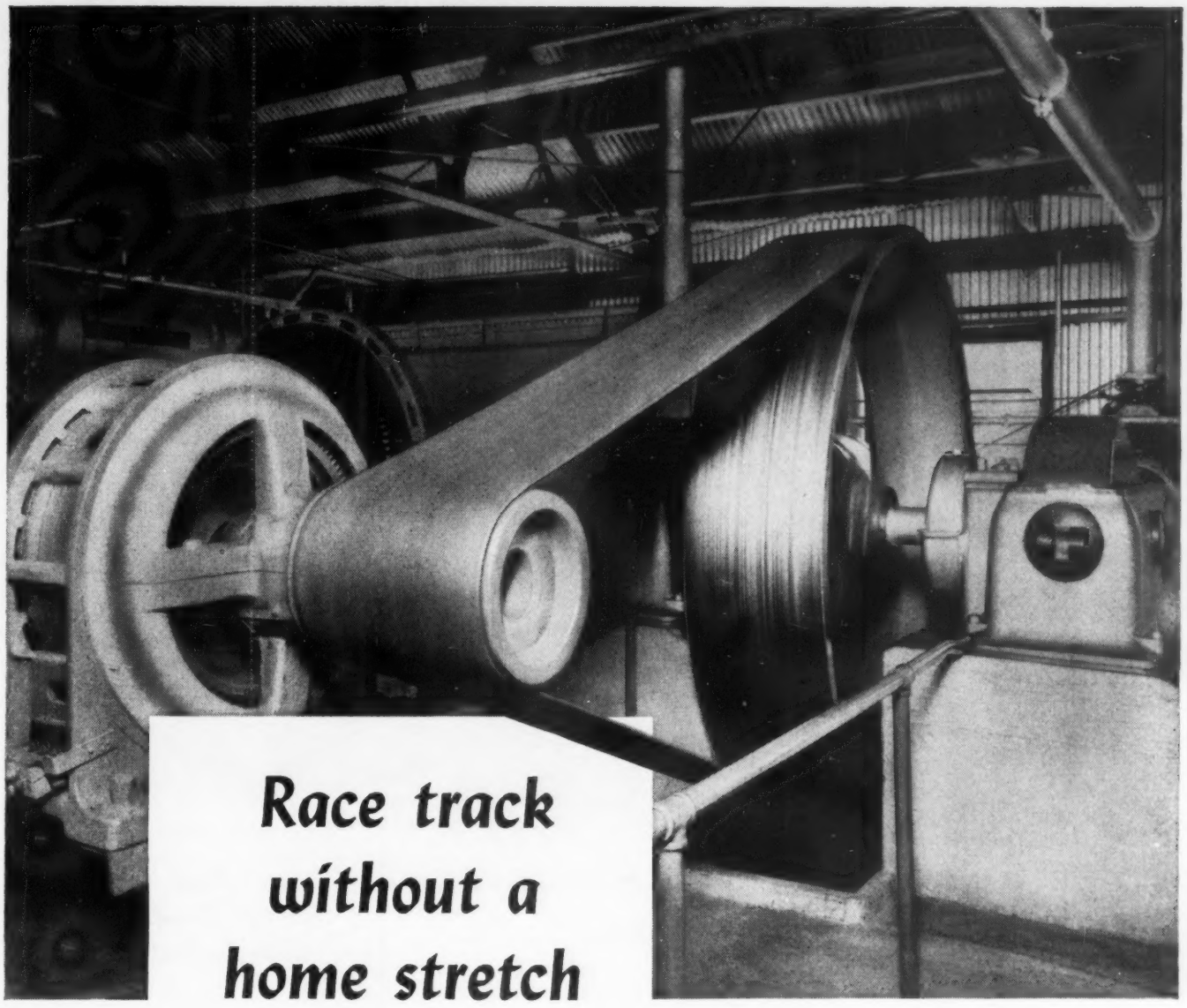
Magnetic field surrounding the carbon electrode, with flux curving off into the specimen electrode, nullifies the transient inductive phenomena of the alternating current, and an arc of greatly enhanced stability is produced. Further, the magnetic stabilizer acts as filter, by accelerating unwanted, low-energy electrons through the arc, and permitting only dominant lines to register on the negative. The necessary electromagnet direct current is of low order, and readily furnished by a simple vacuum tube rectifier.

Excess Light Eliminated

Additionally, a diaphragm with a 1/8-in. aperture was introduced between the arc and the spectrograph, as was a condensing lens, which together effected considerable improvement in eliminating excess light. Optimum arc gaps were experimentally determined, and gages prepared to standardize gap settings. Freshly pointed electrodes are also used for each arc, being prepared by an adapted pencil sharpener.

These measures enable us to produce precision spectra of clarity and consistency on a medium-quartz prism spectrograph, a "junior" instrument normally used for simple qualitative detection. Intensified, "filtered" spectra produce lines of accurately measurable density within the relatively narrow dispersive range of our machine, and results obtained very closely approach those produced by large prism or diffraction grating equipment.

With the problem of a satisfactory light source solved, completion of procedure involved establishing control of operations to produce uniform results, and determination of the standards themselves. Two photographic emulsions were standardized upon—a high speed sensitive film for castings, which contains a lower percentage of minor elements which might easily be blanketed out—and a less sensitive film for forgings which are more heavily alloyed. New density standards are established if there is a possibility that a lot of film has aged sufficiently to lose speed.



Race track without a home stretch

Where horsepower is concerned, a transmission belt is something like a race track.

Send 400 horsepower through a transmission belt at 50 miles an hour. Right away those horses try to "go into the stretch."

Constant flexing tries to separate the belt's plies. Friction and heat try to ruin the carcass. Shock loads—with a force of several thousand pounds—try to pull the belt apart.

Some belts can't take it. They begin to stretch . . . to loosen and slip. The horsepower loses ground—and you lose money.

Hewitt-Robins engineers went to work to lick the problem. They found the answer in a very special kind of belting that lays as flat as the track at Churchill Downs.

It's a belt that won't slip or give when the heat is on . . . *a race track without a home stretch.*

It's Monarch Transmission Belting—"Job-Engineered" to withstand severe stresses and shock loads. Its extra-strong plies of cotton duck are imbedded in special-purpose rubber to give longer flexing life and freedom from stretch.

The belt resists moisture, mildew and grit . . . reduces operating costs by bringing *more power* from motor to main drive.

Monarch Transmission Belting is one of many products "Job-Engineered" by Hewitt Rubber—including all types of industrial hose, belting and other rubber products.

In fact, Hewitt brings you a total of 87 years of practical experience in "Job-Engineering."

Find out how Hewitt Rubber can help *you* conserve power and step up production. Write Hewitt Rubber Division, 240 Kensington Ave., Buffalo 5, N. Y. No obligation, of course!

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HEWITT RUBBER
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INDUSTRIAL HOSE • BELTING • PACKING

Monarch Transmission Belting

A HABIT TO JOE...

"NEW IDEA" TO HIS NEPHEW

...YET BOTH WANT THE SECURITY your P.S. Plan Provides

HAVE YOU told all your new or recently hired employees about the benefits of the Payroll Savings Plan for the regular purchase of U. S. Savings Bonds? Wage earners, according to a recent nation-wide survey, want security more than anything else. They prefer security to big pay, soft jobs, authority, "success."

There is no surer way to this peace of mind than systematic savings. And what surer, safer, better means can your employees find than payroll allotments for U. S. Savings Bonds? Bonds that return $4 at maturity for every $3 they invest!

Your active support of the Payroll Savings Plan is an investment in employee contentment, in the citizenship of your community, and in the security of America's future. This is practical "employee relations" of the highest type and pays dividends of satisfaction to everyone.

Start a drive today for larger participation in the plan. Many employees may be unfamiliar with its advantages. If you want literature for distribution, contact your State Director of the Treasury Department's Savings Bonds Division.

New Savings Bonds Plan won't affect the P.S.P.

THE Treasury Department and the banks of America are making it possible for farmers, doctors, and other self-employed people to participate in "automatic" Bond buying by special arrangement with their banks. This extension of the Savings Bonds program is not a partial payment plan and is intended *only* for people who are not in a position to take advantage of the Payroll Savings Plan.

The Treasury Department acknowledges with appreciation the publication of this message by

STEEL

This is an official U.S. Treasury advertisement prepared under the auspices of the Treasury Department and The Advertising Council.

Exposures vary with the material being analyzed, and are carefully timed in accordance with experimental trials for optimum images. An arc is established for from 10 to 15 sec prior to exposure. Film development is carried out in a tank, with time fixed and water supply thermostatically controlled at a temperature of 70° F.

Overall control on the many variables is established by flashing a standard sample both before and after a run of test specimens. These provide standard spectra in the same set of films, and a reading of them quickly establishes control of conditions. With a well-developed technique, control will usually be found sufficiently close for direct readings; occasionally interpolation may be indicated.

In establishing standards, first step is the preparation or purchase of certified analysis disks, which are required in the high, medium and low percentage ranges for a given alloy. In the case of aluminum alloys, these disks were flashed to establish high, low and medium percentage spectra images for the alloy constituents of copper, manganese, magnesium, silicon and iron. The plates obtained were read by means of the microphotometer, in terms of a scale constructed to indicate mirror-multiplied galvanometer deflection. Deflection readings were then used to construct curves representing scale numbers in terms of percentage of constituents.

Separate standards had to be established for the various alloys as 1 per cent iron, for instance, with 5 per cent copper will produce a characteristic line of different density than 0.5 per cent iron with 1 per cent copper. Varying constituent percentages tend to affect various densities so that standards must be set in consideration of total composition.

With standard curves constructed, analysis becomes merely a matter of careful technique in preparing a plate, to compare sample readings with the curves for straightforward quantitative determination. Results obtained were found to agree with those produced by conventional wet bench methods by 0.02 per cent in the range of 0.1 per cent alloy concentration, and within 0.25 per cent in the 7 per cent alloy range.

Samples have been successfully run with copper up to 5 per cent and silicon up to 7 per cent. Zinc, chromium and nickel cannot be precisely determined by this method, although in specification investigation they can be readily estimated as falling inside or without the proper range.

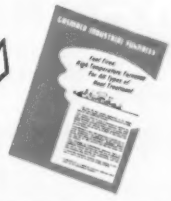
Principal advantage of the spectrographic system is the speed with which work can be accomplished. Our experience with the equipment and procedure outlined above, indicates that one person

THESE Car Type Furnaces are equipped to handle material of almost any size, shape and height. They are ideally suited for heat treating, spheroidizing and annealing applications.

The water tube seal shown above (patent applied for) is a recent development which illustrates how GASMACO E..gineers are constantly improving furnace efficiency. This seal eliminates the possibility of air leakage into the heating chamber around the furnace car—assuring uniform controlled heating within the chamber.

By calling in a GASMACO Engineer on your next heat treating job you will have the benefit of over 45 years' experience in furnace engineering—experience which means uniform, low cost, dependable furnace operation.

Write for Folder A-100 which shows the complete line and describes various furnace applications.



THE GAS MACHINERY Company

Designers and Fabricators of all Types of Industrial Heating and Handling Equipment.

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but he Wasted Time Today...

Joe has just finished a fair day's work, and he's mighty tired—but it's a fact that he wasted time today. He stayed right on the job—no loafing for him—yet the time he spent lifting and lugging heavy materials and getting heavy work into his machine and out again was not productive time. There are many *Joes* in industry today, but their numbers are decreasing constantly, mainly because plant engineers are learning that continuous flow handling methods eliminate this inefficiency, and are applying these methods. A smooth, controlled flow of materials to machines goes a long way toward increasing production and keeping worker fatigue at a minimum. Mathews Engineers are specialists in continuous flow handling methods, and make available to American and Canadian industry the facilities of three modern strategically located plants, and the benefit of many years of experience in dealing with conveying problems in both light and heavy industry.

MC

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can in one day, complete 50 to 60 analyses. This output, including dark room work, is equivalent to the work of three persons in 3 days of long, wet bench determinations; even more time is required in the conventional procedure when a difficult element such as magnesium is involved.

Economy of material is gained in addition to economy of time, as inexpensive chemicals, photographic plates, and carbon electrodes, replace a long list of reagents required in the customary procedure. Electrical power is used, of course, and standard disks are required; the latter can be renewed by simply facing off the surfaces when they are covered with arc burns, and will last indefinitely.

Mr. Brotzman is chief metallurgist at Parker Appliance Co. Mr. Hemker is now research and development engineer, National Carbon Co.

Foreign Language Document Clearing House Set Up

Establishment of a clearing house for co-ordination of translations of German language technical documents is announced by Office of Technical Services, Washington. With widespread interest in the translation of some of these documents, business firms are turning to the OTS for some method of helping translators avoid duplications. The clearing house has been organized for this purpose, the office states.

Between 300,000 and 400,000 documents in the German language have been microfilmed by the OTS. These records were selected from a much larger mass of material on the basis of their value to American industry. These documents are being listed in the weekly "Bibliography of Scientific and Industrial Reports" issued by the OTS. Reports received cover every branch of scientific, technological and industrial knowledge.

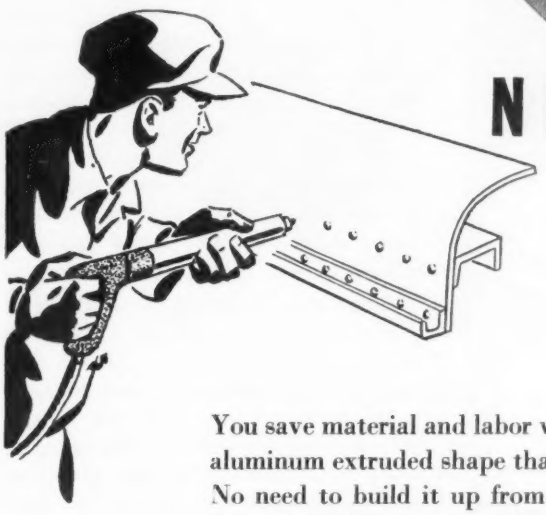
To date, the office reports, several corporations have had translations made for their own use and have submitted copies to the OTS for public use. Although not able to finance translations or employ translators, the office is assisting private translating firms and individuals by informing them whether documents they wish to work on are already being translated by others.

—o—

Complete meals or snack type lunches for 40 to 100 people may be dispensed from the model 40 mobile canteen offered by Mealpack Corp. of America, 152 West 42nd street, New York. Insulated containers keep meals hot for a period of 2 to 3 hours. Provision for keeping beverages hot or cool is incorporated into the design of the 42 x 22 in. aluminum alloy constructed unit which is mounted on rubber-tired casters.

ALCOA ALUMINUM EXTRUDED SHAPES

NEED NO BUILD-UP



You save material and labor when you order an aluminum extruded shape that fits your design. No need to build it up from angles, channels, tees, and other conventional shapes.

The aluminum in an extruded shape is used at maximum efficiency . . . strength where strength is needed, economy of metal where loads are light. No lap joints and double thicknesses to rivet through, no extra rivets to add weight.

Die charges for extruded shapes of your own design are much less than you'd think.

Our engineers will be glad to help you adapt Alcoa Aluminum Extruded Shapes to the things you make. ALUMINUM COMPANY OF AMERICA, 2112 Gulf Building, Pittsburgh 19, Pennsylvania. Sales offices in leading cities.

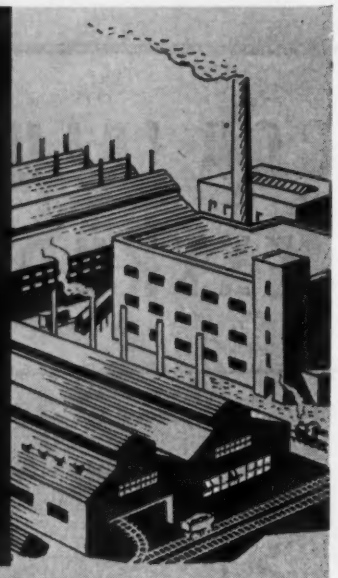
MORE people want MORE aluminum for MORE uses than ever

ALCOA FIRST IN ALUMINUM

ALCOA ALUMINUM

IN EVERY COMMERCIAL FORM

FORT PITT BRIDGE



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WITH SAFETY, ENDURANCE AND ECONOMY

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PHILADELPHIA, PA. Commercial Trust Building

Planning the Forge Shop

(*Continued from Page 86*)

usually only a small part of the total cost of an installation. Also, the average inductor coil may be designed with a number of taps to permit the handling of a wide variety of heating "patterns" simply by changing the taps with each set-up. These two facts make the induction heating process an extremely versatile tool, able to switch from one heating job to another, or even to an Ajax-Northrup melting furnace with little "down-time."

Many installations have been purchased with several different types and sizes of heating coils to handle several different jobs. The coils are easily interchanged by mounting on the cubicle, connecting power, and attaching the cooling-water hoses. Each heating coil is designed for a specific diameter of billet, but slightly smaller diameters can be accommodated with little loss in efficiency. Considerably smaller diameters can also be handled if necessary, with some sacrifice in efficiency due to the reduction in the electromagnetic "coupling" between the coil and smaller work pieces.

Proper Cooling Water Flow

Capacitors, inductor coils, and slide rails (if present in the coils) are all water-cooled. The cooling water is discharged into a small open trough in the side of the cubicle to provide a constant visible check on the proper flow of water. Warning bells, lamps, or automatic safety interlocks can also be provided to protect the coils and capacitors against operation without proper cooling water flow.

Water that contains heavy scale-forming or corrosive elements should be treated before passing it through the coils. In one installation, over 50 Ajax-Northrup heaters in continuous operation were cooled with treated water. A check made after 24 months of operation showed that not one coil had been burned out.

The high-frequency motor-generator unit generally constitutes the greatest part of the initial cost of an induction heating installation. It is a heavy-duty unit which, with reasonable care, should last as long as average central station equipment. Some have been going strong for as long as 20 years in induction furnace applications.

Air-cooled motor-generator sets should be housed in a dust-free room, but there is considerable leeway in the location. It is best to place the motor-generator room as close to the work stations as possible, but some have been installed satisfactorily as much as 400 ft away from the furnaces. The motor-generator

ROUND THE CLOCK POWER

for Industrial Trucks

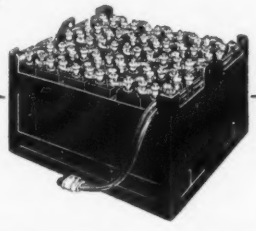
In hundreds of industries where production schedules require it, battery industrial trucks are working 24 hours a day, day after day, with a regularity that many people thought was impossible until they saw it demonstrated.

Here are some of the reasons: A battery industrial truck employs electric-motor drives which are inherently simple; have few moving parts to require repair. The truck is kept continuously supplied with power by batteries that are exchanged at convenient intervals, usually 8 to 12 hours. Charging and any other service needed by the batteries is performed while they are out of the truck.

It is economical . . .

A battery industrial truck is also economical. Its batteries are charged from low-cost electric power and they apply the power to the job with high efficiency: instant starting; rapid acceleration; no power consumption during stops. These are exactly the power characteristics needed by stop-and-go handling work.

Thus a battery industrial truck is an inherently dependable and economical machine. It is extra dependable and extra economical when powered by EDISON Nickel-Iron-Alkaline Batteries, the batteries that have steel cell construction, a solution that is a natural preservative of steel, and a fool-proof electrochemical principle of operation. The Edison Storage Battery Division of Thomas A. Edison, Incorporated, West Orange, N. J. Offices in principal cities. In Canada, International Equipment Company, Limited, Montreal and Toronto.



In Industrial Trucks,* EDISON *Nickel-Iron-Alkaline Batteries Give You These Important Advantages

They are **durable mechanically;** grids, containers and other structural parts of the cells are of steel; the alkaline electrolyte is a preservative of steel.

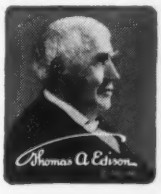
They can be **charged rapidly;** gassing cannot dislodge the active materials.

They **withstand temperature extremes;** are free from freezing hazard; are easily ventilated for rapid cooling.

They are **foolproof electrically;** are not injured by short circuiting, reverse charging or similar accidents.

They can **stand idle indefinitely** without injury. Merely discharge, shortcircuit, and store in a clean, dry place.

They are **simple and easy to maintain.**



EDISON

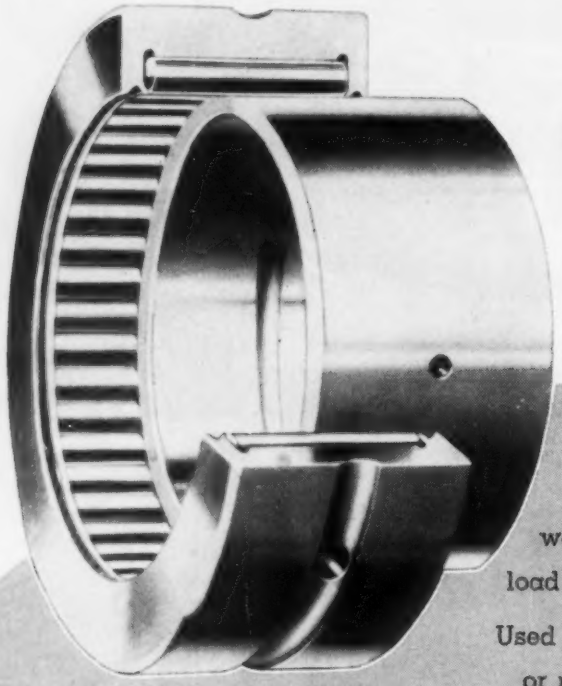
Nickel • Iron • Alkaline

STORAGE BATTERIES

McGILL PRECISION BEARINGS

provide smooth action and dependability in

OILGEAR FLUID POWER PUMPS AND MOTORS



The "SOLIDEND" *MULTIROL* BEARINGS used in OILGEAR FLUID POWER PUMPS and motors are working proof of McGILL balanced design . . . high load capacity . . . and precision dependability.

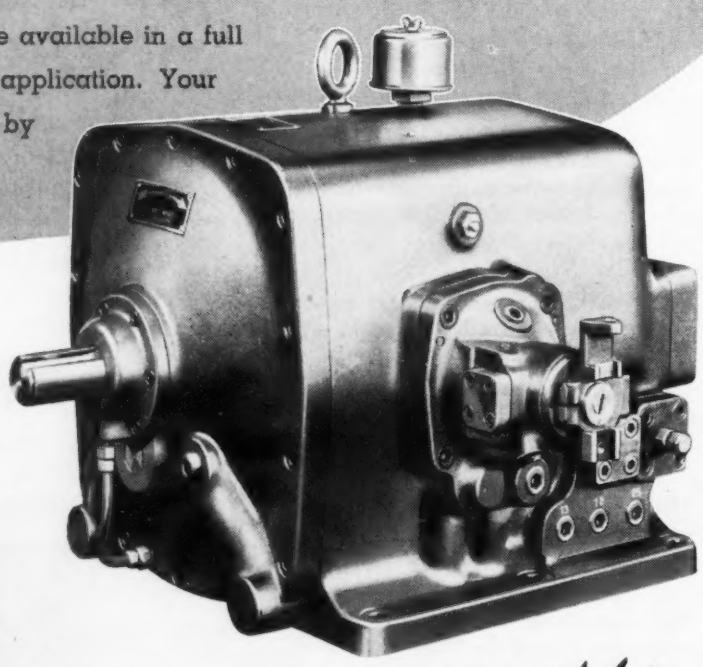
Used to convert rotary motion into stepless variable linear or rotary motion for accurate control of machine function.

OILGEAR PUMPS depend on McGILL precision for smoother, quieter and longer operation.

The ease with which OILGEAR PUMPS operate machine tools, presses, and processing machines is due in part to the high load capacity of McGILL "SOLIDEND" design . . . with its greater effective roller length and solid outer race and roller-retaining end shoulders.

The longer life of "SOLIDEND" *MULTIROL* BEARINGS, due to their rigid construction and adequate lubrication facilities lends to the OILGEAR PUMP a high degree of stamina . . . a minimum of maintenance.

"SOLIDEND" *MULTIROL* BEARINGS are available in a full range of standard sizes to suit any application. Your special problems are welcomed by McGILL engineers.



McGILL precision bearings

For complete information write today for bulletin SM-42: McGill Mfg. Company, Inc., 401 N. Lafayette St., Valparaiso, Ind.

McGill Selected for

• LONG LIFE • SMOOTH ACTION • DEPENDABILITY.

room should be protected from forge shop dirt and air-borne dust by sealing the doors and windows and by using a filtered ventilating system with sufficient capacity to create a positive pressure in the motor room. Enough space should be allowed in the room for easy servicing and cleaning. Whenever conditions warrant, these M.G. sets at slightly higher cost, may be totally inclosed and water cooled so that they can be located in the middle of a very dirty shop.

Motor-generators are available in sizes from 25 to 1200 kw. Selection of size is based largely upon the amount of metal to be heated per hour; coil efficiency and type of metal to be heated also affect the total kilowatt rating required.

Several Smaller Units Preferred

In large operations, several smaller motor-generator units are preferred to one large one. Each smaller set should be selected to operate a battery of heaters or a bank of furnaces. Switching arrangements can be provided so that any motor-generator can be switched over to any battery of heaters or furnaces as desired to meet production schedules. Often generators are paralleled for further flexibility. Individual motor-generators can be shut down during low production periods, whereas one large generator would be idling along with a small load part of the time. Furthermore, the multiple unit plan prevents complete shut-down in case of breakdown of any single power unit.

Frequencies generally used for heating for forging are 1000, 3000, or 10,000 cps, the higher frequencies being used only for small diameters. A motor-generator unit is designed for one frequency only, but since most heating for forging is done at 1000 cycles, the same motor-generator power source can be used for all the heating work in the average forge shop. They can even be connected up to furnaces for melting work.

Small motor-generator sets from 25 to 250 kw output are of the compact two-bearing type. These can be installed in sheet steel cubicles at or near the heaters if desired. In some applications, the furnaces, controls, capacitors, and small motor-generator sets have been grouped together in a single cubicle.

Extremely dusty areas, or places where noise is a major consideration, may require completely sealed, water cooled, relatively quiet motor-generators. These are of the two- and four-bearing type, available in capacities up to 1250 kw.

Motors operate from standard voltages and frequencies. Where power factor correction of the plant load is desired, synchronous motors of unity power factor or 80 per cent leading power factor are used.

Modern induction heating is a far cry

CIRCLE L 12

the alloy that meets emergencies

PHOTO B

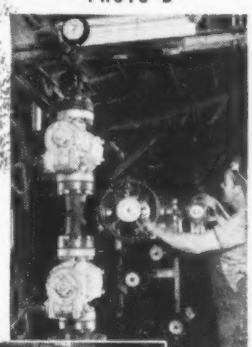


PHOTO A

TWO of the best producing oil wells in Terrebonne Parish, Louisiana were shut down—out of production. Gas distillate corrosion had rendered the valves of the Christmas trees unserviceable. The McEvoy Company of Houston, Texas are specialists in corrosion resistant Well Head equipment. They know from experience that Lebanon's Circle Ⓛ 12 is a chromium alloy especially developed for this service and they telephoned us.

Quick work with patterns, molding, pouring, heat treating and finishing made it possible for us to load two of these alloy castings on a plane five days later. (*Photo A*)

Machined by McEvoy, and tested in the assembly (*Photo B*), the finished, corrosion resistant equipment was delivered and the wells were back in operation 8 days after that first emergency phone call.

. . . or prevents them

TODAY emergencies due to corrosion failures are unnecessary. Metallurgical progress and modern foundry practices make available a variety of alloys designed for the exact corrosive conditions which are encountered in any particular industry. Our representatives are trained to study the technical details of corrosive conditions in your production equipment. A discussion of these matters is the first step toward preventing shut-down emergencies.

Write for Data Sheet describing in detail the corrosion resistant alloy, Circle Ⓛ 12.

LEBANON STEEL FOUNDRY • LEBANON, PA.

"In The Lebanon Valley"

ORIGINAL AMERICAN LICENSEE GEORGE FISCHER (SWISS CHAMOTTE) METHOD

LEBANON ALLOY AND STEEL Castings

CIRCLE L

2 STEPS in Cutting Costs of Handling Bagged Material

1

Install BAKER Fork Truck and Pallets

This will eliminate the back-breaking labor of handling individual bags manually, cut time and cost of car-loading or unloading, add storage space by tiering, and speed inter-department handling.

2

Get Suppliers to Palletize Shipments

This will cut time and cost of unloading incoming material. Supplier will make corresponding savings at shipping end with Fork Truck-Pallet combination. Damage in transit minimized.

Baker Fork Truck tiering pallet loads of bagged starch in storage. Note method of "locking" sacks to prevent side-slipping.

AT THE ERIE, PA. PLANT of one of our customers, raw materials such as clay, starch and talc, are received in bags. A typical carload will contain some 1600 bags, weighing about 50 lbs. each. These bags must be unloaded, stored, and transported to process departments as required.

This company took Step No. 1 years ago, and from the receiving point all bagged materials are carried in unit loads on pallets by fork truck. This has resulted in substantial savings each time the material is handled and has increased warehouse capacity by permitting high tiering. But bags not on pallets when they arrive must first be palletized—an operation requiring about 14 hours per car.

Step No. 2 is now under way. Arrangements are being made with all suppliers of bagged materials, to ship in unit loads, on pallets. Such carloads can be completely unloaded and stored in not much over two hours—as against 14 hours for palletizing alone. Since no individual man-handling of bags is required, heavy labor is eliminated, and damage from handling and shipping is minimized. Comparable savings are realized by suppliers at the shipping end, making it possible to improve deliveries.

Savings possible by complete palletization are demonstrated at the same plant in the case of shipping cartons. For these, which arrive in "knock-down" condition, the company furnishes the supplier with special four-way pallets—and the "flats" arrive in unit loads strapped to these pallets. Unloading and warehousing now takes about three hours per car, where formerly, when "flats" were received unpalletized, it took 24 man-hours for the job.

Let a Baker Material Handling Engineer show you how you can save money with fork trucks and pallets.

Member: Electric Industrial Truck Association

BAKER INDUSTRIAL TRUCK DIVISION
of The Baker-Raulang Company
2167 West 25th Street • Cleveland, Ohio
In Canada: Railway & Power Engineering Corp., Ltd.

Baker INDUSTRIAL TRUCKS

from the charcoal-fired open forge in the old smithy's shop. It is a new forging tool that meets all the exacting demands of today's high-speed, low-unit-cost production lines. It was induction heating that made possible the smooth flow of materials in one of the country's most amazing forging records, where 18-ft. bundles of steel rounds went into one end of the plant, and completed shell forgings rolled out the other end in cartons at the rate of 20,000 per day.

Resistance Welding Design Needed, Engineer States

Reducing costs through designing for resistance welding has not been exploited to its fullest degree, states John D. Gordon, general manager of Progressive Welder Co., Detroit, in criticizing his own industry for failing to supply design engineers with adequate information to accomplish this reduction. He points out that it is in the design stage that the manufacturing costs of such things as automobile bodies are largely controlled.

Designing for resistance welding of a body can effect considerable savings in the final cost, yet the body will remain completely unchanged in external appearance. Gordon states that the body engineer should interest himself in designing parts which lend themselves to simple and economical fabrication methods. In his opinion such a move can go a long way toward offsetting the present trend in wages as shown in the final cost.

To illustrate this point and to cite potential savings by process engineering in the design stage, Gordon proposed an automobile body which was laid out to be assembled with four right and four left hand fixtures, requiring 24 men to assemble the body side-assemblies. Approximate cost of equipment would have been $272,000.

With no changes in body design other than changes in details of construction to facilitate assembly, Gordon stated that it would be possible to reduce the number of fixtures to two major and two subassembly fixtures, with 16 men required. These men with 16 welding guns could assemble a similar number of bodies with an equipment cost of $125,000.

He went on to say that advantages to be gained from such process engineering are not confined to major products. Design and manufacturing changes, he emphasized, must be of such a nature as to simultaneously reduce effort on the part of the operator if he is to be expected to get the production out.

Just Darn Good Blocks

Heppenstall Die Blocks are naturally expected to give, *and do give,* a substantial margin of extra service. Heppenstall Co., Pittsburgh, Pa.

Heppenstall

the most dependable name in die blocks

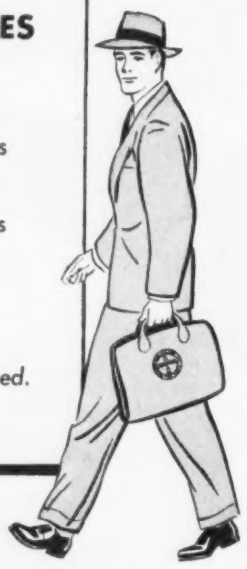
CHECK
HAGAN
FIRST
FOR AUTOMATIC
FURNACES

Regardless of your operation or product, HAGAN offers exclusive—proved-in-service automatic operating features not obtainable on any other furnace. A Hagan engineer will be glad to explain the details, design and operation at your convenience.

HAGAN AUTOMATIC FURNACES
Include

- Continuous Annealing and Normalizing Furnaces
- Automatic Cycle Annealing Furnaces
- Automatic Harden, Quench and Draw Furnaces
- Car Bottom Heat Treating Furnaces
- Rotary Hearth Billet Heating Furnaces
- Special Furnaces for Individual Applications

Any size—any cycle—gas, oil or electrically heated.



GEORGE J.
HAGAN
COMPANY
PITTSBURGH, PENNA.
Detroit • Los Angeles • Chicago • San Francisco

Corrosion Testing

(*Continued from Page 92*)

chromium, molybdenum, silicon, etc., in various combinations. In fact, some of these steels approached the level of corrosion resistance of the straight 5 per cent nickel steel.

As is the case with nickel, increasing the chromium content of a steel improves its corrosion resistance roughly in proportion to the chromium content, Fig. 7. With large amounts of chromium (13 per cent or more), weight loss is practically nil. However, the 13 per cent chromium steel develops a fairly uniform thin coating of rust, while the 18 per cent chromium steel develops considerable stain with occasional blotches of very thin rust.

Austenitic chrome-nickel steels have proved superior to the straight chromium steels. The 18-8 steels, including types 301, 302, 304, 321 and 347 behave equally well, showing only slight staining and occasional superficial pitting, neither of which appears to progress much after the first six months of exposure. Types 316 and 310 are superior to the others and remain virtually unchanged in appearance, the former behaving slightly better than the latter.

Effects of Corrosion on Nickel

Many specimens of nickel and the high-nickel alloys, including Monel, K-Monel, Z-nickel and Inconel have been on test at the 800-ft location for about 5 years. Specimens of Monel have acquired a thin olive-green film without any other evidence of appreciable attack and with no pitting. On K-Monel the film appears to be somewhat thinner than on the regular Monel. Nickel has lost some of its metallic luster, but otherwise has not changed much, while Z-nickel has behaved about the same as the nickel. As for Inconel, it has remained quite bright, showing very little change in appearance.

Specimens of all materials were removed from the racks after exposure for four years, were re-weighed and subjected to tensile tests to observe any changes which might have occurred in mechanical properties. The results, listed in Table II, show negligible corrosion as measured by weight loss, while the changes in tensile properties were hardly outside the error of determination.

This report would not be complete without mention of the cathodic protection project, conducted by Dow, now under way at the marine basin. These studies are pointing the way toward substantial curtailment of the tremendous damage corrosion inflicts on underground and underwater metallic structures such as steel piling, steel poles and tower footings, ship bottoms, etc.

As generally is recognized, this type of corrosion is primarily electrochemical in

No Flaking - No Chipping - No Peeling

when you use Anti-Corrosive IRIDITE as a Paint Base

Tests by several leading companies show that IRIDITE provides a firm base for paint and clear lacquer . . . as well as a corrosion-licking, protective finish . . . on zinc die cast, zinc plated, galvanized and cadmium plated products. IRIDITE keeps the zinc from fouling the paint . . . prevents formation of the soapy, chalky underlying film that destroys adhesion. IRIDITED products take paint readily . . . hold it permanently . . . without flaking, chipping or peeling!

LICKS CORROSION, TOO!

Moreover, IRIDITE is widely used as a final protective finish . . . on zinc, cadmium, galvanizing. A quick IRIDITE dip balks corrosion while adding eye-appeal to your products . . . since it is available in black, green, bronze, olive and transparent IRIDITE bright. And to cut costs, use IRIDITE in combination with zinc plating to replace more expensive materials.

FAST APPLICATION!

Whether you use IRIDITE as a paint base or as a anti-corrosion finish . . . it's easy to apply. Simply immerse your product in an IRIDITE solution . . . manually or automatically . . . on racks or in bulk . . . for 15 to 60 seconds . . . at normal shop temperatures. Your products keep moving along at automatic production line speed . . . and they are dried in a few seconds for immediate painting or handling.

Test IRIDITE as a paint base in your own plant, under your own conditions. Check it as a final protective finish with our FREE TEST PANEL . . . half IRIDITED, half unprotected. Send for your panel today. Allied Research Products, Inc., 4004 E. Monument Street, Baltimore 5, Md.

IRIDITE TEST-imonials

"We have nothing but satisfactory reports on the parts that were Iridite treated on our two body valves."

EDWARD B. LOCKWOOD, *Vice President*
Streamaster Shower Corporation
New York, N. Y.

See how IRIDITE fits into your production. Send for FREE TEST PANEL . . . and subject it to the same corroding conditions your products must meet. Write today.

DISTRIBUTORS: WESTERN MICHIGAN—J. C. Miller Co., Grand Rapids, Mich.; EASTERN MICHIGAN—Wagner Bros., Detroit, Mich.; MINNESOTA & WESTERN WISCONSIN—Industrial Chemical & Equipment Co., Minneapolis, Minn.; ST. LOUIS & CENTRAL SOUTHWEST—La Salco Inc., St. Louis, Mo.; CHICAGO, EASTERN WISC. & IOWA—Allied Research Prod., Inc., Chicago, Ill.; OHIO & INDIANA—J. C. Baker, Cleveland, Ohio; NEW YORK & NEW ENGLAND—Mitchell Bradford Chemical Co., Bridgeport, Conn.; PENNSYLVANIA & NEW JERSEY—MacDermid Inc., Waterbury, Conn.

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ALLIED RESEARCH PRODUCTS, INC.

IRIDITE

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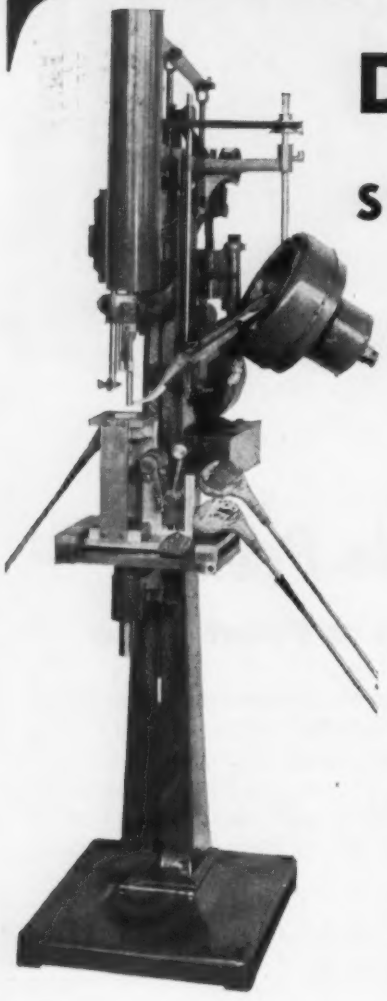
PRODUCTION *Increased TEN-FOLD*

with

DETROIT *—Power—* SCREWDRIVERS

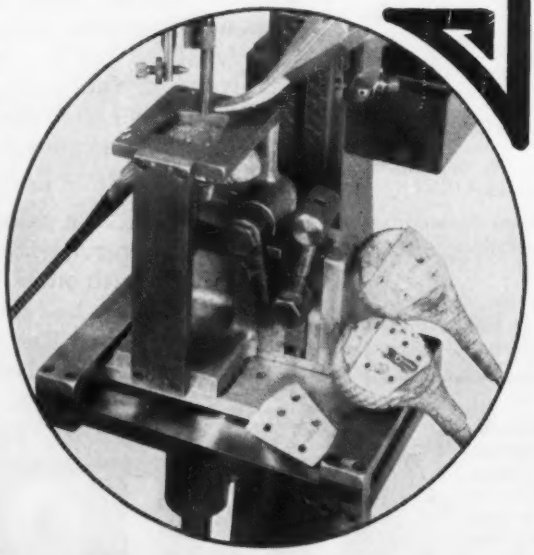


Here is a unique example of the diversified jobs done with amazing speed and ease of operation.

ASSEMBLY OF SOLE PLATES ON GOLF CLUB HEADS

Old Production by Hand, 20 to 25 Assemblies per hour— Possible production with Detroit Power Screwdrivers, 200 to 250 Assemblies per Hour.

The entire club is placed in fixture with Sole plate.—Complete Assembly is locked into place by fast cam action lock —Entire fixture rolling on ball bearing casters.—Indexed by hand to five-hole locations.—Positive positioning made possible by center-locating pin—Screws all driven uniformly without marring heads or stripping.



DETROIT POWER SCREWDRIVER CO.

2811 W. Fort Street
DETROIT 16, MICH.

nature, being caused by reaction between the metal surfaces and chemicals in the earth and water. The surface of the corroding metals is like a series of tiny batteries, some areas acting as anodes, others as cathodes, and the earth or water surrounding the metal serving as the electrolyte. Anodic areas are dissolved to supply the electric current demand by the cathodic areas, and the result is rust.

Plainly, if the current demanded by the cathodic areas could be supplied by an outside anode, rusting should stop. This is precisely what happens. In the present studies, expendable anodes of magnesium are placed in the soil or water surrounding the structure to be protected, being connected to the structure by an insulated copper wire. Thus, with the structure serving as the cathode and the magnesium, in bar form, serving as an expendable anode, what may be likened to a large battery is created in which the magnesium, rather than the structure, gradually is consumed by the electrolytic action. The efficacy of cathodic protection is clearly indicated by the results being obtained with many steel specimens in underwater tests now in progress.

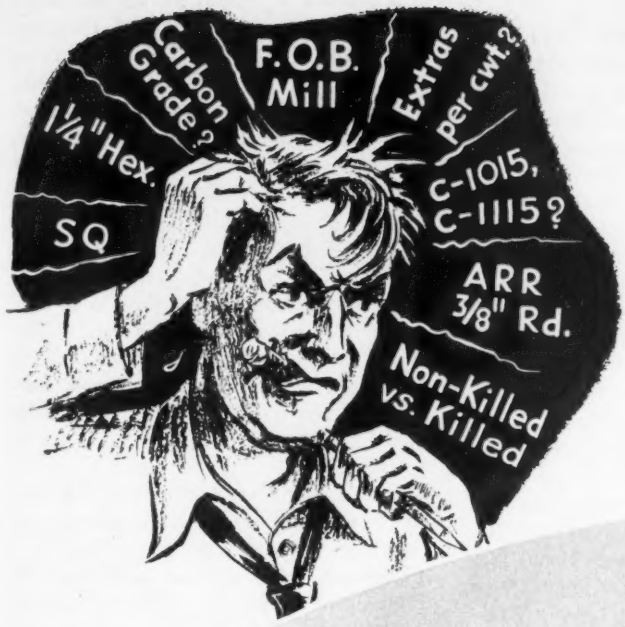
Almost Pure Zinc Produced By German Process

Electrolytic zinc 99.999 per cent pure can be recovered from pyrite cinders on a commercial scale by a German amalgam process which simultaneously produces free chlorine, according to a report offered by Office of Technical Services, Department of Commerce, Washington. The report is one of 12 on zinc. manganese and other amalgams.

A similar process may be used for recovery of manganese, lead, tin, cadmium and thallium. The new method produces purer zinc than can be obtained from other cells and is "a new metallurgical tool for metals that are soluble in mercury," the report statets. Impurities consist of 3 parts per million of aluminum, 5 ppm of copper and 2 ppm of mercury.

—o—

Description of a simple graphical procedure for computing vertical displacements at the surface or within the interior of an elastic, homogeneous, istropic solid body bounded by a plane horizontal surface and loaded by distributed vertical loads at the surface is contained in bulletin No. 367, published by Engineering Experiment Station of University of Illinois, Urbana, Ill. The displacements are computed from charts by counting on the chart the number of elements of area, or blocks, covered by a plan of the loaded area drawn to proper scale and laid upon the chart.



"First Aid"

for figuring COLD FINISHED STEEL PRICES

BLISS & LAUGHLIN, INC.
COLD FINISHED BAR STEELS
Price-a-lator
DIRECTIONS FOR USE:
1. Set grade desired in black window opposite arrow at top of slide rule.
2. Read in bottom white window directly opposite the dot bracket and quality classification desired, the total of extras for grade and quality.
THIS PRICE-A-LATOR HAS BEEN REVISED IN ACCORDANCE WITH BLISS & LAUGHLIN LIST OF EXTRAS, EFFECTIVE APRIL 1, 1947.
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This handy calculator shows the individual and total chemistry and quality extras for standard carbon grades in various bar shapes, sizes and quality classifications.

Just move the slide to the proper setting and read the total . . . it's quick and it's accurate.

The B&L *Price-a-lator* has been developed as a service to the users of Cold Finished Bar Steel. It is sent on request to those who have practical use for it;—Estimators, pricers, order clerks, purchasing agents, metallurgists, engineers, production men and steel buyers.

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LT 800	60-800 F.	Iron-Constantan
LT 810	60-1200 F.	Iron-Constantan
LT 820	60-1600 F.	Iron-Constantan
LT 830	50-2500 F.	Chromel-Alumel

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Metal Stampings

(*Concluded from Page* 101)

the roll assembly is so constructed that rolls may be changed quickly and easily.

While, obviously, coiled strip or so-called "flat wire" is preferable for long production runs, straight cut strip can be used with completely satisfactory results; in fact, due to present difficulties in obtaining coiled strip, the bulk of the work in Lempco's stamping division is produced from straight cut strip. A feed register mechanism may be employed where a full blank is desired at the beginning of the strip. Where, however, fractions of blanks are not objectionable, the stock may be fed with utter disregard to the stroke cycle.

Die Design and Die Steels: Standard practice of die design and manufacture may be adhered to as conventional dies work as well in the new high speed press as the conventional types. However, experience with the Hypermatic has taught more advantageous ways of die layout for better performance and stock economy. Best die design for production, stock economy and die life will result from consultation with engineers who know the press.

Standard practice of "die clearance" is entirely satisfactory for use, but greater clearances between punches and cut-edges are both permissible and practical in many instances. This greater clearance provides a definite advantage in that there is less friction and wear; therefore, it is logical that longer die life can be expected. For die manufacture, use of the die material with which any fabricator is most familiar is recommended. There is no reason to change. The press is said to work well with dies of tool steel, alloys or carbides. Depth of cut multiplied by strokes per minute gives a figure well within the range of the cutting qualities of any good tool steel, even at press speeds of 2000 strokes per minute.

Electric Motors and Controls: The Hypermatic press is sufficiently powered to handle a reasonable amount of overload by two driving motors, one each for the upper and lower die heads. Herringbone gear transmission, members of which are meshed together twice horizontally and twice diagonally, compensates for any slight inequality in motor speed and assures simultaneous action of all four crankshafts. A separate motor is provided for oil pump which provides pressure lubrication to the crankshaft and die head bearings and an oil mist to the transmission gears.

A pressure switch in the oil line prevents operation of the press before sufficient oil pressure is developed and stops the press when the oil pressure falls below a safe minimum or rises above a safe maximum. Sufficient oil pressure is indicated by a green light on the switch panel.

A thermal switch in the oil line stops the press in the event the oil temperature exceeds 180° F. In the 3 years of operation not one of the presses has ever developed more than a normal temperature, but it is conceivable that an excessive temperature might be developed where the room temperature is very high. Every effort has been made to anticipate and correct any contingency that might arise.

Other Features: At no time is it necessary for the operator to reach in between moving parts of the press while it is in motion; as all moving parts, including the feed mechanism, are completely enclosed, the hazard of bodily injury is totally absent.

Life of the press is identical with the life of standard antifriction bearings with which it is equipped. Any bearing replacement, even to the complete rebuilding of the press, can be quickly and easily accomplished. The absence of vibration and nontransfer of stamping impact is the basis for the longevity of this high speed punch press.

AWS Issues Specifications For Welded Bridges

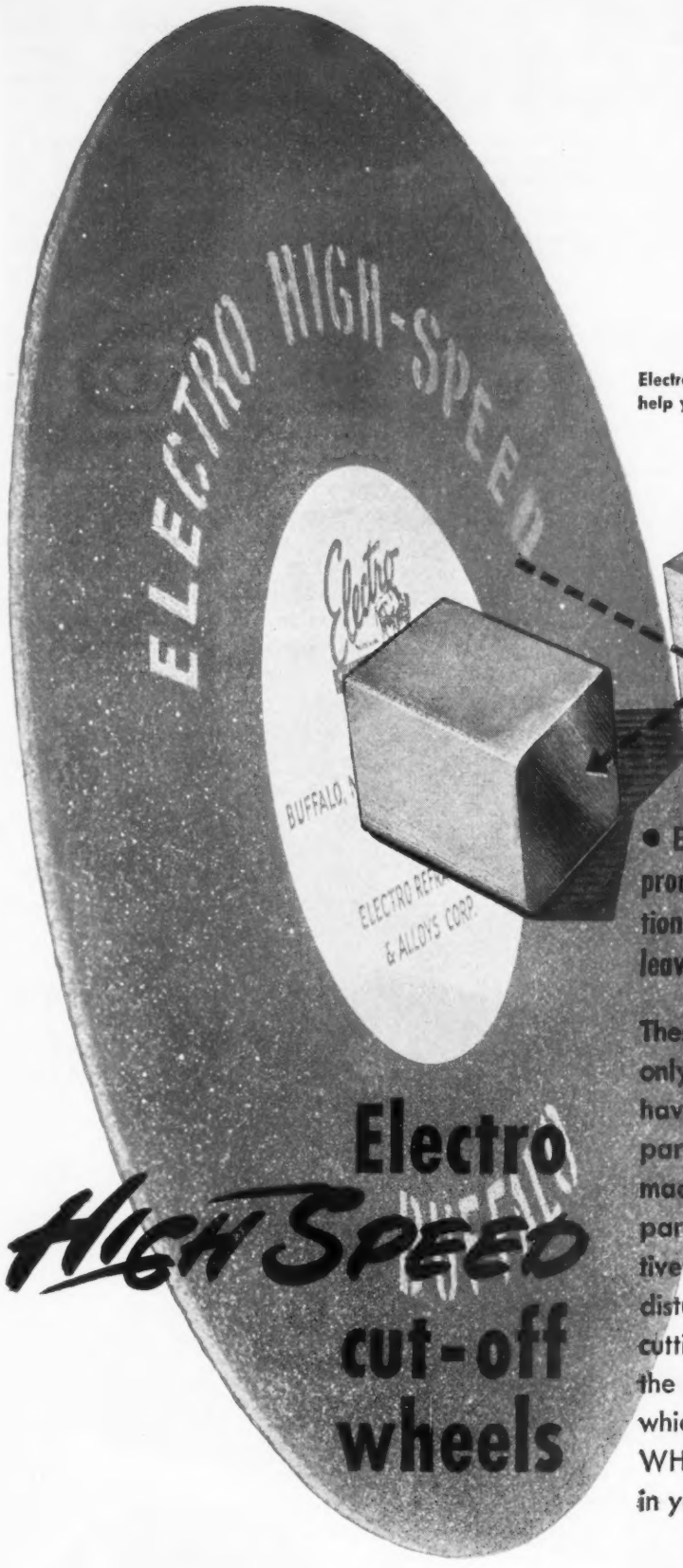
Introduction of a new concept in design formulas, prescribed for both base material and welded connections according to the expected number of repetitions of loading which would produce maximum stress in a member is contained in the fourth edition of the Standard Specifications for Welded Highway and Railway Bridges published by the American Welding Society, New York.

Specifications also include requirements for material, design details, workmanship and inspection. The section on material has been revised to provide more general use of A7 steel and the section on inspection expanded to include provisions for magnetic particle testing as well as x-ray and visual examination.

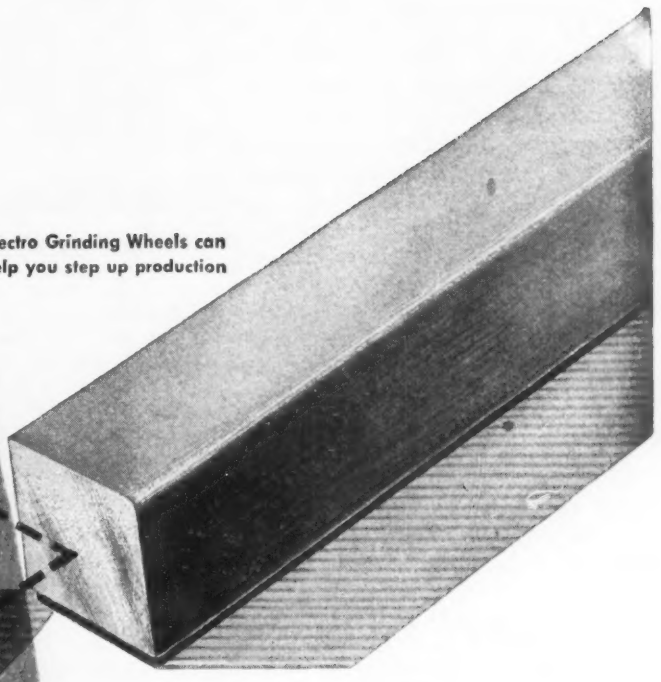
Lists of Technical Reports And Documents Published

Selective lists of technical reports and documents available from the Office of Technical Services, Department of Commerce, Washington, contain titles in 13 specialized industrial fields. Among the fields covered are: Vibrators, tampers, pneumatic tools, drills; jet engines; infrared; guided missiles; and iron ores.

Each list cites author, title, price and reference number of reports included. Only the most important material available from the OTS is listed in each of the selected fields. A complete listing of all available documents is contained in the office's weekly Bibliography of Scientific and Industrial Reports.



Electro HIGH SPEED cut-off wheels



Electro Grinding Wheels can help you step up production

• Electro HIGH SPEED CUT-OFF WHEELS step up production in two ways. (1) They reduce partition time from minutes to seconds. (2) They leave a fine finish on both sides of the cut.

These high efficiency cutters are possible only because of the scientific advances we have achieved with binders and the comparable technological advances we have made with grading and combining abrasive particles. Wheel truth and cutting effectiveness are so extraordinary that molecular disturbance adjacent to the narrow line of cutting action, makes no material change in the quality of the metals or ceramics upon which these Electro HIGH SPEED CUT-OFF WHEELS are used. Let us prove these facts in your plant on your work.

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K-339

Mercury Arc Rectifiers

(*Concluded from Page 107*)

ously-pumped type rectifiers for supplying several thousand amperes at 250 v direct current to steel mill circuits, and the development of single-anode sealed-tube unit substation rectifiers for lower ratings required in smaller plants and foundries have been of primary importance in establishing this type of electronic power converting equipment in the steel industry. However, new applications of mercury arc converters as frequency changers for interconnecting power systems and for supplying kilocycle frequency power for induction heating and melting promises to make this electronic equipment of even greater value to the steel industry in the future. Steel plant engineers are not only adopting the science of electronics for the control of electrical equipment, but are also adapting it for the conversion of power into the form best needed for their operations.

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(3) *Electrical World*, April 13, 1946, Mercury Arc Frequency Changer Limits Rolling Mill Demand, by R. W. Holman, Carnegie-Illinois Steel Corp.

(4) *The Foundry*, Vol. 74, Nov. 1946, pp. 118-120, Electronic Equipment for Induction Melting Alloy Steel by S. R. Durand, Allis-Chalmers Mfg. Co.

(5) *Electronic Industries*, June, 1945, pp. 74-78, 150, 154, Mercury Arc Converter for Induction Heating by S. R. Durand, Allis-Chalmers Mfg. Co.

Steelmaking Practice Becomes Armchair Reading

Talks About Steelmaking, by Harry Brearley; cloth, 6 x 9 in.; published by the American Society for Metals, 7301 Euclid Avenue, Cleveland, for $3.50.

Have you ever wanted to read a book that deals with steel mill practice in such simple language that a novice can understand? Here is one that fills the bill. The book is part suggestion, part history, part criticism and a biased point of view from which the author has found steelmaking an attractive occupation.

Chapters are addressed both to old-timers and young men who anxiously look forward to the day when they can catch the smell of sulphur fumes from slag, view the bessemer blow at its height and observe a crew knocking out an open-hearth heat of steel. Chapters may be read in any sequence or consecutively without loss of clarity.

Subjects covered in the 236 pages of textual matter include chemical and microscopic analysis, pouring practice, details of the huntsman, bessemer, open hearth and electric processes, forging practice, physical testing, clean steel, complaints, scrapalurgy.

As the reader turns page after page it is as though he were seated in the presence of the author listening to an account of what happens within the enclosure of a well-rounded out steel plant — an account told in all simplicity and yet with accuracy. Take the author's comments on slag: "Slag is full of answers for those who have ears to hear. The way it runs, or sits down, or gets up; its color and how it changes when powdered, all mean something; and meanings read in the slag have allied meanings for the steel it covers." A novice can understand this.

To a steel plant observer, this book is a "must." To the seasoned steel-worker who has come "up" the practical way, the book is one he will want to keep close at hand.

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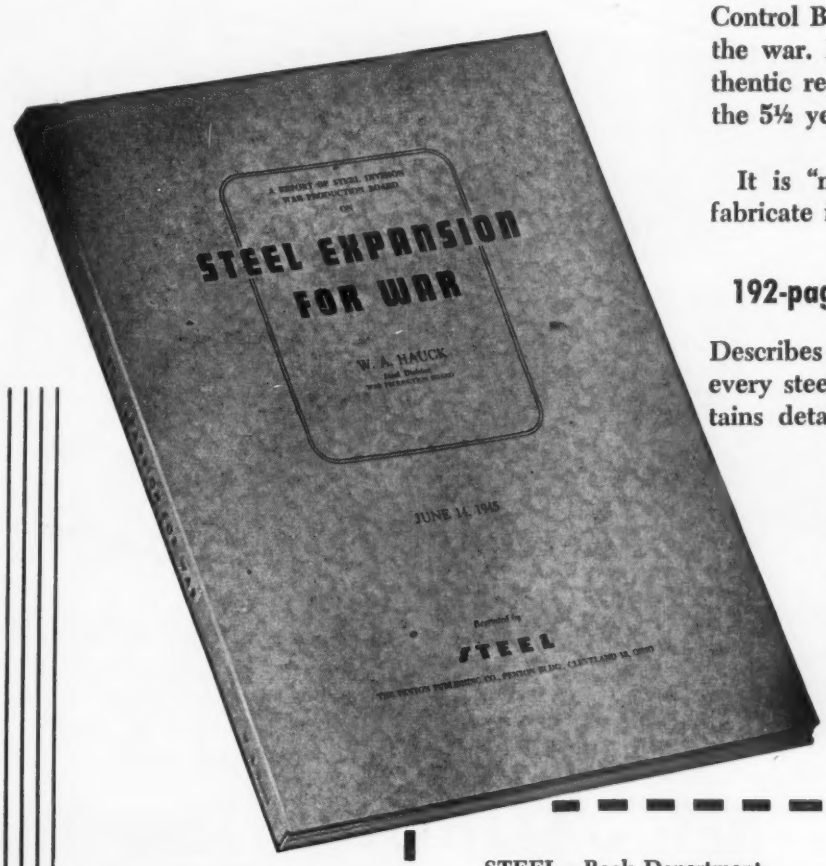
The Steel Situation

THE adequacy of steel supplies is a subject of continued concern for both consumers and the steel industry itself. Many consumers unable to obtain steel, feel that capacity should be increased considerably. The steel industry, on the other hand, recalls vividly that 62 per cent of its capacity was idle during the five years beginning with 1930 and that 41 per cent was not used in the 5-year period ending with 1939.

During the war, some 15,000,000 tons of steel ingot capacity were added, most of which has been acquired by individual steel companies on an outright purchase or lease basis. Since the close of the war, the steel industry has spent many millions of dollars on new equipment and modernization of existing facilities.

In studying the future steel situation, everyone should read the report written by Mr. W. A. Hauck, now chief of the Iron and Steel Branch of the War Assets Administration and formerly chief of the Steel Control Branch of the War Production Board during the war. He has prepared the only official and authentic report on expansion of the steel industry for the 5½ years from January 1, 1940 to June 30, 1945.

It is "must" reading whether you produce steel, fabricate it or are an investor.



192-page Handbook and 18-page Supplement

Describes in detail the added capacity and cost of every steelmaking facility built during the war. Contains detailed list of companies making every type of finished steel product, plus latest data on new mills now being constructed. Included is much heretofore unpublished information on new and revamped facilities of hundreds of plants, including those in ore, ore transportation, coal and coke, refractory, ferroalloy, scrap, foundry and forging industries. It is illustrated by 148 photographs, numerous charts and tables.

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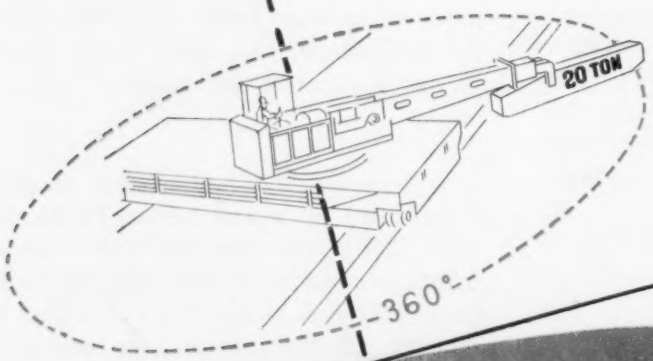
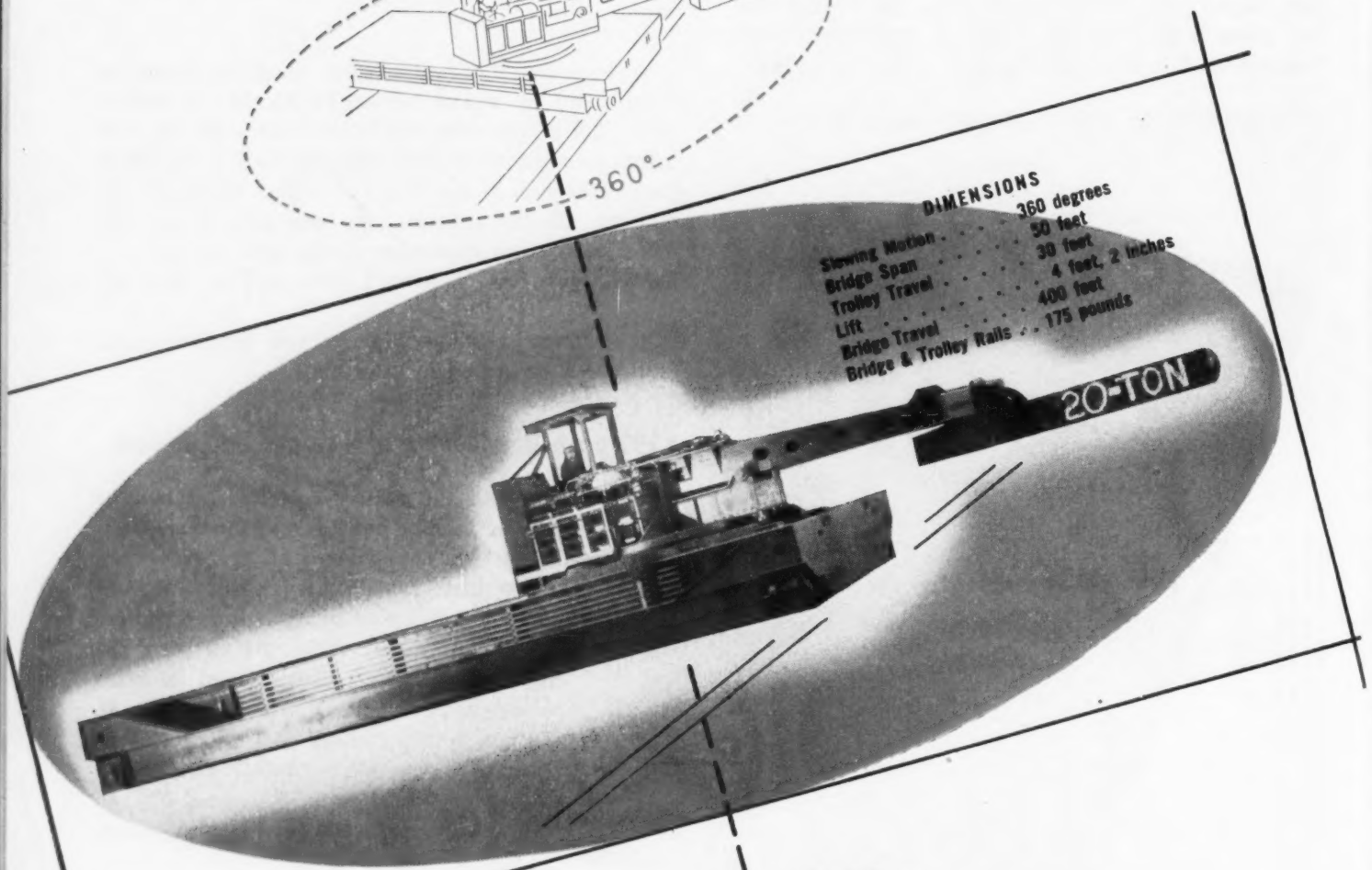
Swinging 20 tons of ingot on a 28 foot radius




DIMENSIONS
Slewing Motion . . . . 360 degrees
Bridge Span . . . . . 50 feet
Trolley Travel . . . . . 30 feet
Lift . . . . . 4 feet, 2 inches
Bridge Travel . . . . . 400 feet
Bridge & Trolley Rails . . 175 pounds
20-TON

NEW *Alliance* Floor Type

Ingot Charging Machine – *"One of the World's Largest"*

● An ingot charging machine must have great mass and stability to skew 360° with a 20 ton ingot gripped in the peel at 28 foot radius. The hoist must also be of sufficient capacity to handle this tremendous cantilever load. The Alliance ingot charger shown here weighs 400,000 pounds, and is installed in one of America's largest forge plants. . . . The rigid cast steel upper revolving frame turns on conical rollers which operate in a bath of oil. These rollers are supported on one-piece cast steel lower frame. Trolley and bridge move smoothly, each on eight rolled steel track wheels housed in cast steel compensating trucks, a design that reduces wheel loading to a minimum. . . . Alliance builds the equipment to move slabs, ingots, hot metal, raw materials, and finished products safely, quickly and easily. For 50-odd years, plant and steel mill engineers have taken their handling problems to Alliance—World's Largest Builder of the World's Largest Cranes.

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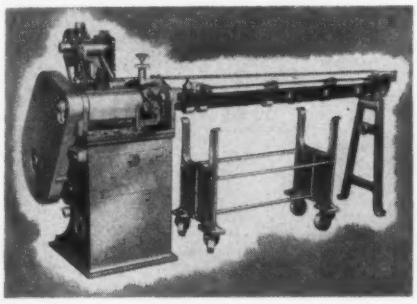
New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 142

1. Wire Straightener

Dore Mfg. Co. Inc., Grayling, Mich., announces a wire straightening and cut-off machine which can accommodate a capacity range of 0.040 to 0.156-in. diameter wire. With simple adjustment the machine will perform a variety of jobs.

Production reports of 10,000 pieces per hour are based on the straightening



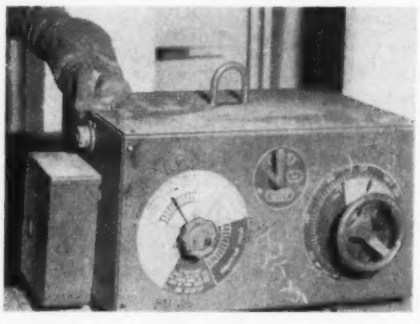
and cut-off of 9-in. lengths of 0.040-in. diameter basic bright wire. Simple machine may be operated by inexperienced personnel after brief training.

2. Spring Nut

Adaptable for use in hopper feeders and various types of power wrenches, the Diamond G spring nut, made by George K. Garrett Co., 1421 Chestnut street, Philadelphia 2, has great gripping power on the threads of a screw or bolt and therefore will resist loosening. The Diamond G spring lock nut is made to supply a locking action.

3. Welding Control

Welding sets are automatically shut off at the end of an adjustable period with the welding control for all standard makes of direct current arc welding sets

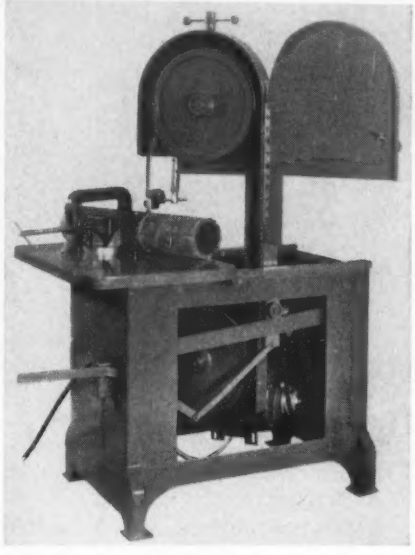


running on ordinary electric power, made by DV Welding Controls, 3959 Piedmont avenue, Oakland 11, Calif. The operator may start the set without leaving his work, by striking an arc.

An arc time meter in the control provides data for production and quality control in a more accurate, convenient and direct form than can be obtained through measuring footage of weld or weighing the welding rod. It registers only while a useful arc is maintained. Both control and meter mount on side or end of the welding set.

4. Band Saw

Acting as two machines, the Roll-In metal cutting band saw, made by Roll-In Saw Co., Parma, Mich., operates on a new principle of gravity feed. As a cut-off saw with gravity feed, the blade



rolls into the work, saving wear on the blades since correct pressure is automatic.

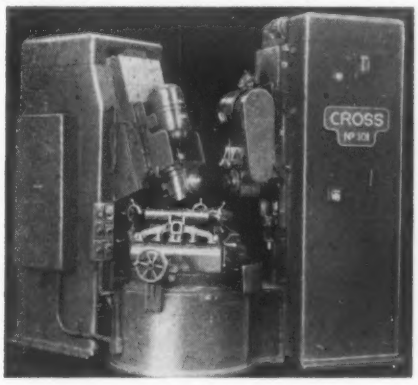
For contour work the blade is locked in a stationary position with a clamp, permitting cutting of any shape, size or kind of metal and plastic.

5. Special Purpose Miller

Requiring an angular vertical feed for milling exhaust manifold tail pipe flange on the first cutting station and a box type feed motion for milling intake manifold joint faces on the second station, the special purpose milling machine, built by Cross Co., Detroit, has a net production of 110 pieces per hour. Performing these operations in confined quarters, the machine is of the three station power indexing type.

First station is used for loading and unloading the work, second and third for milling operations noted above. Work at all three stations goes on simultaneously so that one part is completed with each index. Carbide cutters are used to permit maximum feeds and speeds. All control, except work clamping, is by pushbutton.

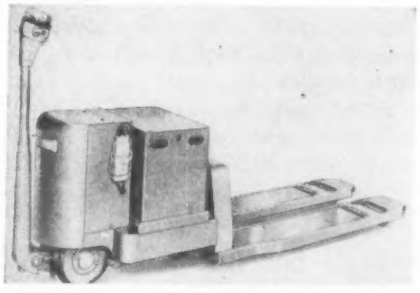
Machine, which has hardened and ground steel ways, is designed to use



standard Cross elements. Second station uses a No. 101 vertical column, modified for angular feed. The third station uses the same column without modifications. The 36-in. power driven index table is also a standard unit.

6. Motorized Lift Truck

Produced in pallet and platform styles in a variety of sizes, the model K Hydroelectric motorized lift truck, made by Lift Trucks Inc., 2425 Spring Grove avenue, Cincinnati 14, has a capacity of 4000 lb, two forward and two reverse speeds and dynamic braking. Features



include two wheel front drive for greater stability and easier turning and maneuvering; motor, drive and controller which may be removed from the frame in a unit; and speeds and brake controlled by three pushbuttons contained in the steering handle.

Platform models are offered in 20 and 26 3/4-in. wide and 36 to 72 in. long platforms, all with 3 1/2-in. lift from

6 to 11 in. standard heights. Pallet models are 24 and 27 in. wide, 20 to 60 in. long with a 4-in. lift from a 3 1/2-in. lowered position. Trucks may be equipped for 8, 12 and 24 hour service with standard batteries.

7. Spray Gun

Eclipse Air Brush Co., 430 Park Avenue, Newark 7, N. J., announces a 46-in. heavy duty spray gun designed for the application of very heavy materials at high speed. Requiring minimum air volume and pressure consistent with the

job, it will handle roofing compounds, fibrated bitumastics, emulsified asphaltums, etc.

Fluid connection is a standard ¾-in. pipe thread. From this point to the fluid outlet is a 45 degree angle giving an unrestricted flow of material. Fluid valve has a ½-in. travel so that there can be no obstruction when gun is wide open for operation.

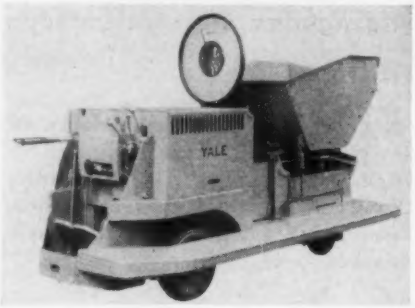
8. Drum Pumps

Air-operated heavy-duty drum pumps designed to handle lubricants, oils, sealing materials, paints, etc. from 55-gal. drums are offered by Aro Equipment Corp., Bryan, O. Pumps are available in drum cover types for full opening drums and in bung-bushing types for mounting in drums equipped with a 2 in. bung hole. Both types are offered in seven pressure ratios from 40 to 1 to 2 to 1, for any material requirement.

9. Scale and Dump Truck

Three different handling tools are combined in one unit by Yale & Towne Mfg. Co., Philadelphia, in the shock absorbing dump bucket, platform scale and standard electric load carrier truck. Designed for weighing out batches, transporting them around the plant and dumping them into furnaces, tanks or hoppers, the unit may be used in a wide variety of operations.

Hopper of 40 cu ft capacity is supported on platform of scale by means of four heavy coil springs which give scale protection against shock of dropping heavy loads into the bin and transporting them over rough areas. Scale has a 24



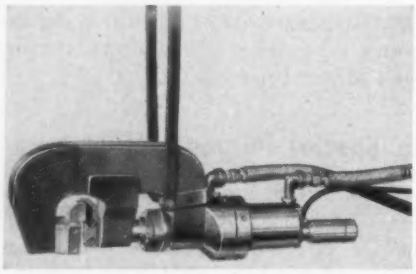
in. diameter shatter proof glass protected dial which is graduated in 5 lb graduations and records loads up to 3000 lb. Truck has features of regular general purpose electric load carrier made by the company.

10. Expansion Joints

Low pressure, large diameter packless expansion joints ranging in size from 14 in. to 6 ft are manufactured by MagniLastic Division, Cook Electric Co., Chicago 14. Joint is normally supplied in type 347 stainless steel to accommodate pressures up to 30 psi, but is available in other metals as required. Number of bellows flanges may be increased or decreased to change total expansion of the joint.

11. Portable Shear

Development of a portable hydraulic shear for production cutting of assembled parts which cannot be placed in a power saw or otherwise held securely for cutting, is announced by Hannifin Corp., 1101 South Kilbourn avenue, Chicago. Shear shown is designed for

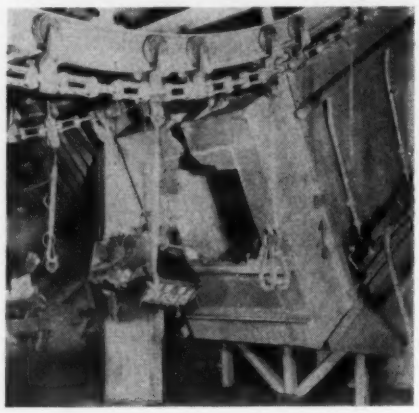


slipping off ends of 1 x 3/8-in. copper bars after electrical windings have been applied. It is capable of exerting a 12 1/2 ton shearing force.

Other shears of this type are available in capacities up to 100 tons with yokes designed for work in hard-to-get-at places. Pushbutton control on shear is connected to a hydraulic pressure generator. Depressing button starts shear on automatic cycle in which blades close on work at low pressure, go through the cutting stroke at full pressure and retract after cutting. Releasing button at any point effects instant return to starting position. Built-in guides are provided for squaring up with work for cutting.

12. Continuous Furnace

Gas fired, with 40 pressure-type burners and walls 9 in. thick, the continuous furnace for relieving stresses in cylinder block castings, developed by Bellevue Industrial Furnace Co., 2971 Bellevue avenue, Detroit 7, has inside



dimensions of 3 ft wide, 9 ft 9 in. high and 70 ft long. It has two heat zones automatically controlled by a Brown electronic potentiometer.

Casing consists of steel plate reinforced with structural steel shapes. Whole unit is suspended from the ceiling, the bottom of the furnace having four clean-out doors for removal of sand. A catwalk running the full length on both sides of the furnace, together with two side doors, gives further access to the interior.

13. Tape Moistening Solution

Tape-Tack, a chemical moistening aid developed by Paisley Products Inc., 1770 Canalport avenue, Chicago 16, solubilizes glue films of gummed tape, labels, envelopes, stamps, etc. Added to moistening water, the solution dissolves glue and keeps it in a state of fluidity, assisting in its penetration into container surfaces.

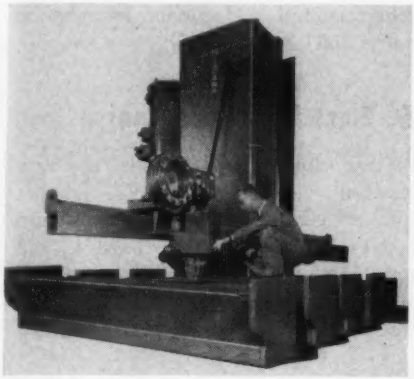
14. Diamond Finishing Compound

A technique for application of diamond grit to a full range of finishing operations is a development of Magnus Chemical Co. Inc., Garwood, N. J. Process uses colored, premixed diamond compounds supplied in tube or stick form. It may be used to increase life of carbide or steel cutting tools, polish molds, plug gages, punches or to refinish rolls for all types of foil and sheet. Compound is supplied in eight particle sizes from

approximately 120 microns, for extra coarse cutting, to 1 micron, for super high micro finishing.

15. Automatic Welder

Faster welding with less passes per seam and stronger and better welds at lower labor cost are possible with the new electronic automatic welding machine announced by Niagara Machine & Tool Works, 683 Northland avenue, Buffalo. The electronic control provides



variable speed of the machine along a track so that the length of welding is governed only by the track length.

Welds perpendicular to the track are accomplished by traveling the welding heat at a variable speed along the cantilever beam. Pushbutton control quickly brings the power elevated beam to any height, thereby providing maximum speed in changing from one setup to the next, whether the job be a long slender member or a massive frame.

16. Wear Test Accessories

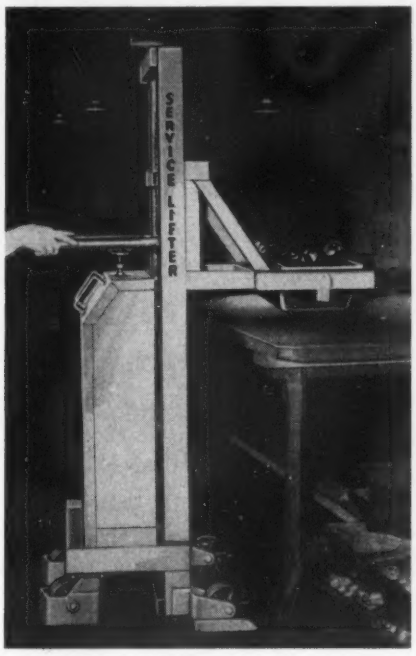
Accessories developed for use with the Taber Abraser in wear-testing a wide range of materials are announced by Taber Instrument Corp., North Tonawanda, N. Y. One of these, an interval

timer, enables control of operating time of abrasion tests within prescribed limits.

Second accessory, a duplex refacing stone, is designed for refacing Calibrase type abrading wheels, providing improved control of wheel surfaces and assuring standardization of wheels. Third accessory is the Abraser Drymount, a dual-coated adhesive sheet that simplifies and speeds preparation of thin, flexible fabrics or other similar materials for wear testing. It "anchors" the specimen to metal or cardboard backing to prevent wrinkling or buckling.

17. Tote Pan Lifter

Stoop, stretch and strain are taken out of tote pan lifting with the lifter manufactered by Service Caster & Truck Corp., Albion, Mich. Storage battery operated, the new handling device moves



pans speedily, safely and easily through a lifting height of 54 in. Overall height of lifter is 5 ft 9 in.

Controlled by a pushbutton on the handle and powered with two standard 6 v batteries, the unit has a capacity of 150 lb. Protection of operator's feet is provided by safety hoods mounted on lifter's swivel caster running gear.

18. Weather Proof Switches

Heavy sponge rubber gaskets make a tight seal between the box and the door on the line of bulletin 1300 weather proof safety switches offered by Electric Controller & Mfg. Co., 2700 East 79th

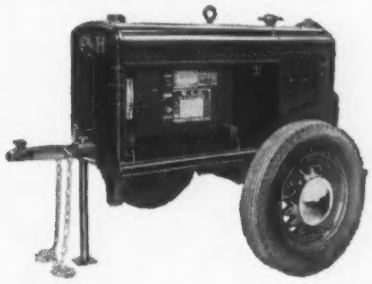
FOR MORE INFORMATION
on products and equipment described in this section, fill in a card following page 142.

street, Cleveland 4. Exceptionally compact and of rain and dust tight construction, enclosures are of heavy gage steel with aluminum finish with slanted roof and drip trough over the front door.

Switch mechanism is fully interlocked to prevent opening the door when switch is in the "on" position, this being a feature of both the single and double door models. Interlocking feature is incorporated in the inner door of the double door types. Steel enclosure is cadmium plated or galvanized.

19. Portable Arc Welder

Designed for shop, yard or field service, a new model WN-200 self-powered arc welder, developed by Harnischfeger Corp., Milwaukee, provides 200 amp with a welding service range of from 30 to

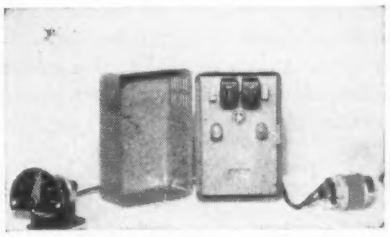


260 amp. It is made as a stationary or trailer unit, in both cases engine and welder being mounted on a frame of steel tubing and angle iron. Skid model also has lifting eye for crane lifting.

Both models are equipped with square frame arc welding generators. In each, one control is used to select any desired welding heat from minimum to maximum capacity. Arc response is automatic on all types of work with all types of electrodes. Unit is rated at 30 v at 2900 rpm. A 4-cylinder air cooled engine of 26.5 hp supplies power for both models.

20. Positioning Control

Operations such as accurately controlling inaccessible dampers from control stations on the floor and positioning heavy work in machine tools without hand labor may be controlled from a single co-ordinated desk, using an elec-



tronic positioning control system developed by General Electric Co., Schenectady, N. Y.

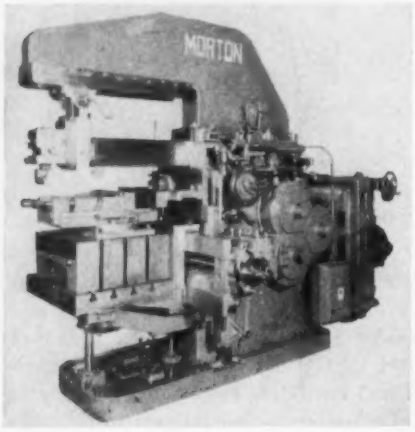
Three parts make up the system—a master control station, a follow-up device (which may be either small selsyns of potentiometers, depending upon the application) and an electronic control panel. A driving motor is not included as any

reversing alternating or direct current motor that can handle the load is acceptable.

System may be used on drives up to 1½-hp in general, and on many drives over this rating, after consideration of inertia of the load, speed, gear reducer arrangement and accuracy of positioning needs.

21. Draw Cut Shaper

Built for either light or heavy duty shaping and planing, the 32-in. stroke draw cut shaper made by Morton Mfg. Co., Broadway and Hoyt, Muskegon Heights, Mich., has, in addition to this



stroke, a 32 in. horizontal or side feed, 16 in. vertical feed and a distance of 30 in. from ram to table when lowered. A rectangular hollow bored forged steel ram measuring 6 x 7 in. provides ample strength for deep cut with coarse feeds.

Table and work are aligned by two elevating screws. Rapid power traverse and automatic feeds for both horizontal and vertical movement is provided. Draw cut eliminates loosening and tightening of outer support bolts to the table each time it is moved vertically.

Machine is powered with a 7½ hp alternating or direct current multispeed motor or a 10 hp constant speed motor and control with variable speed transmission. Chip removal towards the machine column instead of towards the operator, shaping to layout lines on outside of work in clear view of operator and the use of forming tools and special setups are other features.

22. Hydraulic Hand Pump

Double action hydraulic hand pump, developed by Electrol Inc., Kingston, N. Y., weighs 8 lb, has a bore of 1¼-in., a stroke of 1¼-in., a volume of 1.5 cu in. per cycle and an operating pressure range from 0 to a maximum of 1500 psi. The load on the handle at 500 psi is only 17 lb, and at the maximum only 52 lb.

Housing of the pump measures 7 3/16-in. long, 3 in. wide and 2½-in. high and is of the foot-mounting type. Suction and pressure ports are ⅜-in. NPT and located on the same face. The 22 in. metal pump handle travels through a maximum arc of 60 degrees.

23. Induction Heater

A 750 w, 450,000 cycle Toccotron, a bench type induction heating machine designed primarily for silver brazing and soldering, but also adaptable to hardening, annealing and forging within its power capacity, has been developed by Ohio Crankshaft Co., 3800 Harvard avenue, Cleveland. Unit is of the tube oscillator type.

Operation is from a 110/120 v alternating current, single phase 60-cycle current source; unit is tapped to accommodate either single or multiple-turn inductor coils. Water connections are not required. Heating unit is suitable for

both automatic or manual operation and is designed to operate continually at full load for mass production. Inductor coils may be made by forming copper tubing or wire to the required shape.

24. Solenoid

Consisting of only five component parts—base, armature, coil, coil locks and back stops—the new solenoid announced by Practical Electric Co., 4505 Oakwood boulevard, Melvindale, Mich., has an armature designed with a self-contained built-in pusher, making the unit applicable to either push or pull work. Coil current required to maintain the magnetic circuit is extremely small, thus preventing any harmful temperature rise.

25. Belt Conveyor

With all components such as chain, belt, sprockets, channels, angles and frame constructed of heat treated aluminum alloy, the prefabricated belt conveyor manufactured by Patron Transmission Co., 129 Grand street, New York 13, is rust and corrosion proof and resistant to most acids, chemicals and fumes. Suitable for operation at any speed up to 100 fpm, it has a load capacity of 250 psf.

Units are available in widths from 6 to 60 in. and heights from 15 in. up, 36 in. being the standard height. They are shipped prefabricated in 5 ft sections. Belt is supported by phenolic rollers, eight to the foot. Standard equipment includes speed reducer, drive, pillow blocks, takeups, shafts and electric reversing control. Maximum temperature limit is 500° F.

26. Electric Impact Tool

Using standard attachments, the new universal electric, all purpose impact tool, manufactured by Ingersoll-Rand Co., 11 Broadway, New York 4, will apply and remove nuts, drill, tap, ream, drive and remove screws and studs, extract broken cap screws and studs, run

wire brushes, drill brick and masonry, etc. Designated as size 4U, the tool weighs 6½ lb and has a free speed of 2000 rpm. Its reversible, universal, 3 amp electric motor, capable of delivering 1900 rotary impacts per minute, operates on 110 v, ac-dc.

Tool runs as a conventional electric tool until the resistance to spindle rotation reaches a certain amount when a mechanism converts the power of the motor into "rotary impacts" which exert a more powerful turning effect. This mechanism permits the spindle to be stalled completely while motor continues to run. Torque reaction to operator is also eliminated.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Steel Price Increase To Follow Coal Wage Rise

Adjustment to average about $5 a ton expected within few weeks. Other raw material costs to advance. Return of miners clears way for resumption of high productivity

METALWORKING executives view with mixed feelings the coal wage settlement, giving the miners one of the largest wage increases ever granted to a large group of workers.

The agreement is welcomed for clearing the way for a long period of high and uninterrupted steel production, giving promise of a new record peacetime year, and presaging fairly early balancing of supply and demand for steel products.

Not so welcome are the effects the agreement will have on metalworking costs. The increased costs of mining coal will soon be reflected in steelmaking raw materials and later in other costs. Steel prices are scheduled to advance an average of $5 a ton within the next several weeks, as producers make adjustments to cover both the increased costs resulting from the coal settlement and also the earlier increase in steelworkers wages. Announcement of new steel price schedules is expected early in August.

While the first increases will be felt in raw materials—steel, coal, coke, pig iron—the effects of the coal settlements will fan out through industry and eventually may affect transportation costs, power, and possibly labor rates in other fields.

Metalworking officials are already studying the effects of the cost increases on the prices of their finished products. For many, advances in selling prices will be necessary.

Some raw materials costs already have advanced. Coke prices are up $1 to $1.75 in some districts. Other producers expect to make increases ranging up to $2 soon.

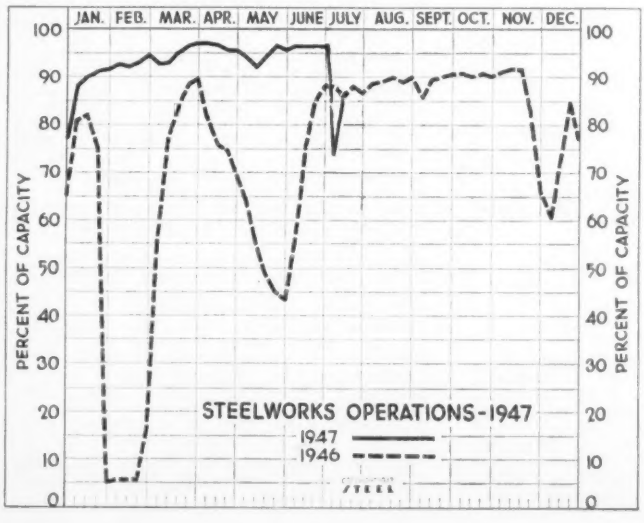
Scrap buying interest picked up immediately after announcement of the coal peace promised resumption of a high rate of steelmaking. Prices advanced sharply in some districts, heavy melting steel on the Cleveland market, for instance, advancing up to $4 a ton. In the East, the uptrend was less sharp. The scrap market was strengthened by the fact that many scrap-producing plants will be closed for vacation periods throughout the summer, reducing the flow of material to mills.

Undertone of the scrap market was strengthened also by the prospects of an early advance in pig iron prices. Up to late last week, no iron producer had followed the Birdsboro, Pa., producer in advancing prices $6 a ton, an action taken prior to the coal miners' settlement. Further increase in pig iron prices is likely as a result of higher coke costs, a minimum of $2 being mentioned in the trade for foundry grades and a slightly larger advance for basic.

Firth-Sterling Steel Co. and Crucible Steel Co. of America have advanced tungsten high-speed steels about 8 cents a pound, effective Aug. 1, due chiefly to increased costs of ferrotungsten. Some minor changes in the lower-priced tool and die steels will be made effective on the same date.

Production was being stepped up rapidly last week and likely will resume the pre-coal-crisis rate by the end of this week. The estimated national steelmaking rate increased 13 points last week to 86 per cent of capacity. Advances in district rates were as follows: 44½ points to 77.5 per cent in Cleveland, 26½ points to 85 per cent in Pittsburgh, 15 points to 78 per cent in Wheeling, 15 points to 55 per cent in Youngstown, 12 points to 99 per cent in Birmingham, 12 points to 84 per cent in Cincinnati, 8 points to 92 per cent in eastern Pennsylvania, 2½ points to 84.5 per cent in St. Louis, and ½ point to 93.5 per cent in Chicago. Operations in New England eased 2 points to 83 per cent while holding unchanged at 92 per cent in Detroit and 88.5 per cent in Buffalo.

STEEL's composite price average on steelmaking scrap increased to $35.50 from $35.08 while holding unchanged on finished steel at $69.82, on semifinished steel at $52.10 and on steelmaking pig iron at $32.49.



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended July 12	Change	Same Week 1946	Same Week 1945
Pittsburgh	85	+26.5	89	87
Chicago	93.5	+ 0.5	88	94.5
Eastern Pa.	92	+ 8	85	87
Youngstown	55	+15	87	90
Wheeling	78	+15	89	91.5
Cleveland	77.5	+44.5	89	78
Buffalo	88.5	None	88.5	90.5
Birmingham	99	+12	99	95
New England	83	− 2	55	85
Cincinnati	84	+12	77	91
St. Louis	84.5	+ 2.5	54.5	78
Detroit	92	None	89	80
Estimated national rate	86	+13	86	90

Based on weekly steelmaking capacity of 1,749,928 net tons for 1947; 1,762,381 net tons for 1946; 1,831,636 tons for 1945.

COMPOSITE MARKET AVERAGES

	July 12	July 5	June 28	One Month Ago June, 1947	Three Months Ago Apr. 1947	One Year Ago July, 1946	Five Years Ago July, 1942
Finished Steel	$69.82	$69.82	$69.82	$69.82	$69.82	$64.45	$56.73
Semifinished Steel	52.10	52.10	52.10	52.10	52.10	40.60	36.00
Steelmaking Pig Iron	32.49	32.49	32.49	32.49	32.49	27.50	23.00
Steelmaking Scrap	35.50	35.08	33.08	32.48	33.94	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	July 12, 1947	June, 1947	Apr., 1947	July, 1946
Steel bars, Pittsburgh	2.60c	2.60c	2.60c	2.50c
Steel bars, Philadelphia	2.98	2.98	2.98	2.86
Steel bars, Chicago	2.60	2.60	2.60	2.50
Shapes, Pittsburgh	2.50	2.50	2.50	2.35
Shapes, Philadelphia	2.64	2.64	2.64	2.48
Shapes, Chicago	2.50	2.50	2.50	2.35
Plates, Pittsburgh	2.65	2.65	2.65	2.50
Plates, Philadelphia	2.85	2.85	2.85	2.558
Plates, Chicago	2.65	2.65	2.65	2.50
Sheets, hot-rolled, Pittsburgh	2.50	2.50	2.50	2.425
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.275
Sheets, No. 10 galv., Pittsburgh	3.55	3.55	3.55	†4.05
Sheets, hot-rolled, Gary	2.50	2.50	2.50	2.425
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.275
Sheets, No. 10 galv., Gary	3.55	3.55	3.55	†4.05
Strip, hot-rolled, Pittsburgh	2.50	2.50	2.50	2.45
Strip, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.05
Bright basic, bess. wire, Pittsburgh	3.425	3.425	3.425	3.05
Wire nails, Pittsburgh	4.125	4.125	4.125	3.75
Tin plate, per base box, Pittsburgh	$5.75	$5.75	$5.75	*$5.25

* Nominal. † Base, No. 24 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$50.00	$50.00	$50.00	$38.00
Slabs, Pittsburgh, Chicago	42.00	42.00	42.00	39.00
Rerolling billets, Pittsburgh	42.00	42.00	42.00	39.00
Wire rods $\frac{7}{32}$ to ¼-inch, Pitts.	2.55c	2.55c	2.55c	‡2.30c

‡ Base, No. 5 to $\frac{5}{32}$-in.

Pig Iron

	July 12, 1947	June, 1947	Apr., 1947	July, 1946
Bessemer, del. Pittsburgh	$34.83	$34.83	$34.83	$29.77
Basic, Valley	33.00	33.00	33.00	28.00
Basic, eastern del. Philadelphia	35.72	35.52	35.52	27.93
No. 2 fdry., del. Pgh, N. & S. sides	34.33	34.33	34.33	29.27
No. 2 fdry., del. Philadelphia	36.54	36.02	36.02	28.43
No. 2 foundry, Chicago	33.00	33.00	33.00	28.50
Southern No. 2 Birmingham	29.88	29.88	29.28	22.88
Southern No. 2, del. Cincinnati	34.75	34.75	34.75	26.94
Malleable, Valley	33.50	33.50	33.50	28.50
Malleable, Chicago	33.50	33.50	33.50	28.50
Charcoal, low phos., fob Lyles, Tenn.	43.00	40.50	40.50	33.00
Gray forge, del. McKees Rocks, Pa.	33.66	33.66	33.66	28.61
Ferromanganese, fob cars, Pittsburgh	140.25	140.25	140.25	140.00

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$35.25	$32.44	$35.81	$20.00
Heavy melt. steel, No. 2, E. Pa.	37.50	33.38	33.25	18.75
Heavy melt. steel, Chicago	33.75	30.75	32.75	18.75
Rails for rerolling, Chicago	40.50	38.75	38.25	22.25
No. 1 cast, Chicago	39.00	39.50	42.50	20.00

Coke

Connellsville, beehive furnace	$10.00	$9.56	$9.06	$8.75
Connellsville, beehive foundry	10.875	10.75	10.375	9.50
Chicago, oven foundry, del.	17.10	16.10	16.10	15.10

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, price negotiated, fob mill. Forging quality, $40, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown. **Alloy Steel Ingots:** Pittsburgh, Canton, $52.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $42; Portsmouth Steel Corp., $55-$60, Portsmouth, O. Detroit, del., $45; eastern Mich., $46.

Forging Quality Blooms, Slabs, Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $50; Detroit, del., $53; eastern Mich, $54.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $61, del. Detroit $64; eastern Mich., $65.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $50; Portsmouth Steel Corp., $66; Portsmouth, O.

Skelp: Pittsburgh, Sparrows Point, Youngstown, Coatesville, 2.35c per lb.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, $\frac{7}{32}$ to ¼-in., inclusive $2.55-2.80 per 100 lb. Galveston base, $2.65. Worcester, add $0.10. San Francisco (base del.), $3.27.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown, Chicago, Gary, Cleveland, Buffalo, Birmingham, Duluth, base, 20 tons one size, 2.60c; Detroit, del., 2.75c; eastern Mich., 2.80c; New York, del., 3.01c; Phila., del., 2.98c; San Francisco (base, del.), 3.33-3.65c; Los Angeles (base, del.), 3.325-3.56c; Seattle, 3.285c, base.

Rail Steel Bars: 2.60c-2.95c, same basing points as merchant carbon bars, except base is 10 tons.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.05c; Detroit, del., 3.20c; eastern Mich., 3.25c (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.20c; Detroit. 3.35c; Toledo, 3.40c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 3.80c; Detroit, del., 3.95c; eastern Mich., 4.00c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.45c; San Francisco (base, del.), 3.03c; Los Angeles (base, del.), 3.025c; Seattle, 2.985c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base, 2.60-2.95c.

Iron Bars: Single refined, Pittsburgh 6.15c-†6.70c; double refined, 7.00-†8.50c; Pittsburgh, staybolt, 7.85c-†10.00c.

† Hand puddled.

Sheets

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c; Philadelphia, del., 2.70c; New York, del., 2.79c; Los Angeles (base, del.), 3.24c; San Francisco, (base, del.), 3.245c. (Andrews Steel Co. quotes Middletown, O., base for shipment to Detroit; Alan Wood Steel Co., Conshohocken, Pa., quotes 3.10c, Sparrows Point, Md., base; Granite City Steel Co., 2.875c, fob Granite City, Ill., 2.775c, fob Gary or Birmingham.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.20c; Granite City, base, 3.30c; Detroit, del., 3.35c; eastern Mich., del., 3.40c; New York, del., 3.61c; Philadelphia, del., 3.58c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, Youngstown, Sparrows Point, Canton, Middletown, base 3.55c; New York, del., 3.84c; Philadelphia, del., 3.75c; Los Angeles (base, del.), 4.32c; San Francisco (base, del.), 4.325c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 3.65c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc), corrugated 10 cents extra; Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.15c; copper-iron or pure iron, 4.50c. Granite City base prices 10 points higher. Los Angeles (base, del.), 4.94c; San Francisco (base, del.), 4.945c.

Aluminized Sheets, No. 20: Hot-dipped, coils or cut to lengths: Pittsburgh, 9.00c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.55c. (Empire Steel Corp., 4.00c, Pittsburgh.)

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.55c; Granite City, base, 3.65c; Detroit, del., 3.70c; eastern Mich., 3.75c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.20c; Kokomo, Ind., 4.30c. Armature: Pittsburgh, Chicago, Gary, 4.50c; Granite City, Ill., Kokomo, Ind., 4.60c. Electrical: Pittsburgh, Chicago, Gary, 5.00c; Granite City, Kokomo, 5.10c. Motor: Pittsburgh, Chicago, Gary, 5.75c; Granite City, 5.85c.

Dynamo: Pittsburgh, 6.45c; Granite City, 6.55c. Transformer 72, 6.95c; 65, 7.65c; 58, 8.35c; 52, 9.15c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.50c; Detroit, del., 2.65c; eastern Mich., del., 2.70c.

Cold-Rolled Strip, 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.20c; Chicago, base, 3.30c; Detroit, del. 3.35c; eastern Mich., 3.40c; Worcester, base, 3.40c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.20c; over 0.40 to 0.60 carbon, 4.70c; over 0.60 to 0.80, 5.30c; over 0.80 to 1.00, 6.80c; over 1.00, 9.10c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95, $5.15, $5.35, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.60c; Granite City, Birmingham, Sparrows Point, 3.70c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-lb base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $13.50; 15-16 $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.65c; Coatesville, Claymont, Geneva, Utah, 2.80c; New York, del. 2.94c; Phila., del., 2.85c; St. Louis, del., 2.47c; Boston, del., 2.86c; San Francisco and Los Angeles, del., 3.29c-3.46c.
(Central Iron & Steel Co., Harrisburg, Pa., 3.85c, basing points; Alan Wood Steel Co., Conshohocken, Pa., 2.80c, Coatesville and Claymont, equivalent; Worth Steel Co., Claymont, Del., 2.90c mills.)

Floor Plates: Pittsburgh, Chicago, 3.90c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.787c; Coatesville, 4.15c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.50c; New York, del., 2.70c; Phila., del., 2.64c; Geneva, Utah (base, del), 2.675c; Los Angeles (base, del.), 3.17c-3.41c; Los Angeles and San Francisco (sizes produced at Geneva only), del., 3.14c; Kaiser, del., San Francisco, 3.41c.
(Phoenix Iron Co., Phoenixville, Pa., nominally, 4.00c, fob Phoenixville.)

Steel Piling: Pittsburgh, Chicago, Buffalo, $3 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads

Bright, basic or bessemer	*$3.30–$3.55
Spring (except Birmingham)	**$4.25

Wire Products to Trade

Nails and Staples

Standard and cement-coated	†$3.75–$4.50
Galvanized	‡$3.75–$4.50

Wire, Merchant Quality

Annealed (6 to 8 base)	§$3.95
Galvanized (6 to 8 base)	§$4.40

(Fob Pittsburgh, Chicago, Birmingham, per base column)

Woven fence, 15 gage and heavier	††84
Barbed wire, 80-rod spool	††94
Barbless wire, twisted	94
Fence posts (no clamps)	††90
Bale ties, single loop	††86

* Worcester, $3.40, Duluth, $3.35, base. San Francisco (base, del.) $4.31 for bright basic only.

** Worcester $4.35, Duluth and Trenton, N. J., $4.50, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.

† Worcester $4.05, Cleveland $3.85, base. San Francisco (base, del.) $4.83.

‡ Duluth $3.75, Cleveland $3.85, base. San Francisco (base, del.) $4.83.

§ Worcester $4.05, annealed; $4.50, galvanized. Duluth $3.95, annealed; $4.40, galvanized base. San Francisco (base, del.) $4.96, annealed; $5.41, galvanized.

†† San Francisco (base, del.): Woven fence, 107; barbed wire, 114; bale ties, 110. Duluth (base): Woven fence, 84; barbed wire, 94; fence posts, 90.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.50 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $2.85 per 100 lb; light rails (rail steel), Williamsport, Pa., $3.20, Pittsburgh, $2.85.
Relaying, 60 lb and over fob warehouse $45-$47 per net ton.

Supplies: Track bolts, 6.50c; heat treated, 6.75c. Tie plates, $2.80 per 100 lb, fob mill; $3.15 base, Seattle. Splice bars, $3 per 100 lb. Standard spikes, 3.65c-4.50c; screw spikes, 5.30-6.40c.

Tubular Goods

Standard Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

Butt Weld

In.	Steel Blk.	Steel Gal.	In.	Iron Blk.	Iron Gal.
⅛	48	23	½	−2	+20
¼ & ⅜	51	30½	¾	−11½	+10
½	55½	41	1-1¼	−17	+ 2
¾	58½	45	1½	−22½	− 1½
1-3	60½	47½	2	−23	− 2

Lap Weld

In.	Steel Blk.	Steel Gal.	In.	Iron Blk.	Iron Gal.
2	53	39½	1¼	− 1	+20
2½-3	56	42½	1½	− 7	+13
3½-6	58	44½	2	−14½	+ 5½
*8	58	42½	2½-3½	−17	+ 1½
*10	57½	42	4	−21	− 4
*12	56½	41	4½-8	−19	− 2½
			9-12	−10	+ 7

* Not T. & C.

Seamless
Steel

In.	Blk.	Gal.	In.	Blk.	Gal.
2	52	38½	*8	57	42
2½-3	55	41½	*10	56½	42
3½-6	57	43½	*12	55½	41

* Not T. & C.

Line Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Seamless	In.	Butt Weld
2	51	⅛	47
2½ & 3	54	¼ & ⅜	50
3½ to 8	56	½	54½
10	55½	¾	57½
12	54½	1 to 3	59½

Boiler Tubes: Net base prices per 100 feet fob Pittsburgh, in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O.D. Sizes	B.W.G.	Seamless Hot Rolled	Seamless Cold Drawn	Elec. Weld Hot Rolled	Elec. Weld Cold Drawn
1″	13	....	$10.89	$10.62	$10.62
1¼″	13	....	12.90	10.59	12.58
1½″	13	$12.00	14.26	11.70	13.90
1¾″	13	13.65	16.23	13.31	15.82
2″	13	15.29	18.17	15.00	17.95
2¼″	13	17.05	20.26	16.71	20.00
2¼″	12	18.78	22.31	18.38	22.00
2½″	12	20.57	24.43	20.11	24.07
2¾″	12	21.80	25.89	21.27	25.46
3″	12	22.87	27.18	22.26	26.68
3¼″	11	26.88	31.94	26.15	31.33
3½″	11	28.86	34.30	28.06	33.64
4″	10	35.82	42.55	34.78	41.68
4½″	9	47.48	56.42	....	....
5″	9	54.96	65.30	....	....
6″	7	84.38	100.25	....	....

Pipe, Cast Iron: Class B, 6-in. and over $65 per net ton, Birmingham; $70, Burlington, N. J.; $75.56, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	48 off
⅝ and ⅞ x 6-in. and shorter	50 off
Larger diameter; longer than 6 in.	47 off
Tire bolts	38 off
Step bolts	46 off
Plow bolts	57 off
Lag bolts	
¼ in. up to 1 in., 6 in. and shorter	50 off
¼ in. up to 1 in., longer than 6 in.	48 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
7/16-in. and smaller	51 off	....
½-in. and smaller	....	50 off
½-in.-1-in.	48 off	....
⅝-in.-1-in.	....	49 off
1⅛-in.-1½-in.	46 off	47 off
1⅝-in. and larger	....	40 off

Additional discount of 15 for full containers.

Hexagon Cap Screws

Upset 1-in. smaller (10-20 bright)	56 off
Upset (10-35 heat treated)	
⅝ x 6	51 off
¾, ⅞, & 1 x 6	47 off

Square Head Set Screws

Upset 1-in. and smaller	61 off
Headless, ⅛-in. and larger	46 off
No. 10 and smaller	56 off

Rivets

Fob Pittsburgh, Cleveland, Chicago Birmingham

Structural	5.25c
Lebanon, Pa.	5.40c
7/16-in. and under	55-5 off
Lebanon, Pa.	55-5 off plus 15c per cwt.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl $1.50-$2.00 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per bbl; reg. carbon 16.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, per lb
18.00	4	1	...	74.00c
1.5	4	1	8.5	59.00c
12	3	0.50	...	62.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301	26.00c	29.50c	37.00c	22.00c	28.00c
302	26.00	29.50	37.00	23.50	30.50
303	28.50	31.50	39.00	29.50	36.00
304	27.50	31.50	39.00	25.50	32.50
308	31.50	37.00	44.50	31.00	38.00
309	39.00	43.50	51.00	40.50	51.00
310	53.50	56.50	57.50	53.00	61.00
316	43.50	48.00	52.00	43.50	52.00
321	31.50	37.00	44.50	32.00	41.50
347	36.00	41.50	49.00	36.00	45.50
431	21.00	24.00	31.50	19.00	24.50
440A	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403	23.50	27.00	32.00	23.00	29.50
410	20.50	23.50	29.00	18.50	24.00
416	21.00	24.00	29.50	20.00	25.50
420	26.00	31.00	36.50	26.00	39.50
430	21.00	24.00	31.50	19.00	24.50
430F	21.50	24.50	32.00	20.50	27.00
442	24.50	28.00	35.50	26.00	35.00
443	24.50	28.00	35.50	26.00	35.00
446	30.00	33.00	39.50	38.00	56.50
*501	9.00	13.00	17.50	13.00	18.50
*502	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (20%)					
304	....	24.00	22.00	....	....
410	....	22.00	20.00	....	....
430	....	22.50	20.50	....	....
446	....	29.00	27.00	....	....

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax

PIG IRON

Prices per gross ton	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$34.50	$34.00	$35.50	$35.00
Newark, N. J., del.	36.34	35.84	37.34	36.84
Brooklyn, N. Y., del.	37.50	....	....	38.00
Philadelphia, del.	....	35.72	....	....
Birdsboro, Pa., base	40.50	40.00	41.50	41.00
Birmingham, base	29.88	29.38	34.50	....
Baltimore, del.	36.28	....	....	....
Chicago, del.	34.12	....	....	....
Cincinnati, del.	34.75	34.25	....	....
Newark, N. J., del.	35.96	....	....	....
Philadelphia, del.	35.13	....	....	....
St. Louis, del.	33.87	33.37	....	....
Buffalo, base	33.00	32.50	34.00	33.50
Boston, del.	39.48	38.98	40.48	39.98
Rochester, del.	34.84	34.34	35.84	35.34
Syracuse, del.	35.50	35.00	36.50	36.00
Chicago, base	33.00	32.50	34.00	33.50
Milwaukee, del.	34.32	33.82	35.32	34.83
Muskegon, Mich., del.	36.83	....	....	37.33
Cleveland, fob furnace	33.00	32.50	34.00	33.50
Akron, del.	35.17	34.17	35.67	35.17
Duluth, base	33.50	33.00	34.50	34.00
Erie, Pa. base	33.00	32.50	34.00	33.50
Everett, Mass., base	45.00	....	....	45.50
Granite City, Ill., base	33.50	33.00	....	33.50
St. Louis, del.	34.25	33.75	....	34.25
†**Neville Island, Pa.,** base	33.50	33.00	34.00	33.50
Pittsburgh, del., N. & S. Sides	34.33	33.83	34.83	34.33
Provo, Utah, base	33.50	33.00	....	....
Seattle, Tacoma, Wash., del.	38.60	....	....	....
Portland, Oreg., del.	38.60	....	....	....
Sharpsville, Pa., base	33.50	33.00	34.00	33.50
Steelton, Pa., base	34.50	34.00	35.50	35.00
Swedeland, Pa., base	35.50	....	36.50	36.00
Philadelphia, del.	36.54	....	37.54	37.04
Troy, N. Y., base	34.50	34.00	35.50	35.00
Toledo, O., base	33.00	32.50	34.00	33.50
Cincinnati, del.	36.50	36.00	....	....
Youngstown, O., base	33.50	33.00	34.00	33.50
Mansfield, O.	36.48	35.98	36.98	36.48

† To Neville Island base add: 66c for McKees Rocks, Pa.; $1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.33, Oakmont, Verona; $1.49 Brackenridge.

Exceptions to above prices: Kaiser-Frazer Parts Corp., Struthers, O., charges 50 cents a ton in excess of Sharpsville, Pa., basing point price for No. 2 foundry, basic, bessemer and malleable pig iron.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base)	$42.50		
6.51-7.00	$43.50	9.01- 9.50	48.50
7.01-7.50	44.50	9.51-10.00	49.50
7.51-8.00	45.50	10.01-10.50	50.50
8.01-8.50	46.50	10.51-11.00	51.50
8.51-9.00	47.50	11.01-11.50	52.50

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron: Si 14.01-14.50%, $61.75, Jackson, O.; $65, Niagara Falls; $66, piglets, $64, open-hearth and foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn....$43.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $33.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $39; Birdsboro, Pa., $45, base; Philadelphia, $41.22, del. Intermediate phosphorus, Central furnace, Cleveland, $36.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	*$9.50–$10.50
Connellsville, foundry	9.75–12.00
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

* Operators of hand-drawn ovens using trucked coal, $10.10-$11.10.

Oven Foundry Coke

Kearney, N. J., ovens	$15.35
Chicago, outside del.	16.10
Chicago, del.	17.10
Terre Haute, del.	15.60
Milwaukee, ovens	16.85
New England, del.	17.25
Birmingham, Del.	15.00
Indianapolis, ovens	14.50
Cincinnati, del.	16.50
Ironton, O., ovens	13.35
Painesville, ovens	14.60
Cleveland, del.	15.90
Buffalo, del.	16.10
Detroit, del.	15.75
Philadelphia, ovens	15.50
Swedeland, Pa., ovens	15.50
Portsmouth, O., ovens	14.00
Fairmont, W. Va., ovens	13.75
Pittsburgh, del.	15.61

Coal Chemicals

Spot, gal, freight allowed east of Omaha. Effective as of Apr. 1, 1947

Pure and 90% benzol	19.00c
Toluol, two degrees	23.00c
Industrial xylol	23.00c
Solvent naphtha	26.00c

Per pound fob works

Phenol (car lots, returnable drums)	11.25c
Do., less than carlots	12.00c
Do., tank cars	10.25c

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "house-hold use"	9.50c

Per ton, bulk, fob plants

Sulphate of ammonia	$30.00

Refractories

Per 1000, fob shipping point Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$87.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	70.00
Ala., Ga.	70.00
N. J.	75.00

Intermediate Heat Duty

Ohio	64.00
Pa., Ill., Md., Mo., Ky.	64.00
Ala., Ga.	56.00
N. J.	67.00

Low Heat Duty

Pa., Md., Ohio	56.00

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry Press	47.00
Wire Cut	45.00

Malleable Bung Brick

All bases	80.00

Silica Brick

Pennsylvania	70.00
Joliet, E. Chicago	79.00
Birmingham, Ala.	70.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash.

Bulk	24.00
Single bags	28.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite	70.00

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom.
Swedish basic, 60 to 68%	13.50
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50–6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$32–$34

Manganese Ore

46-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 63.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$27-$27.50
45% no ratio	28.00
48% no ratio	30.00
50% no ratio	31.00
Brazilian—nominal	
44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

HIGH-STRENGTH—LOW-ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	3.85	3.85	3.85	3.85	3.85	3.85	...	...	...
Cold-Rolled	4.75	4.75	4.75	4.75	...	4.75	...	...	...
Galvanized	5.40	...	...	...	...	.....	...	...	...
Strip, Hot-Rolled	3.85	3.85	3.85	3.85	...	.....	...	...	...
Cold-Rolled	4.55	4.65	4.65	4.65	...	.....	...	...	...
Shapes, Structural	3.85	3.85	.....	3.85	...	.....	3.85	...	...
Plates	4.10	4.10	4.10	...	4.10	.....	...	...	...
Bars and Bar Shapes	4.00	4.00	4.00	4.00	...	4.00	...	4.00	4.00

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R Rds. ⅜" to 3"	C-F Rds. ½"& up	H-R Alloy (§4140)	Structural Shapes	Carbon ⅜"-¾"	Floor ¾" & Thicker
Boston (City)	4.50	5.67[4]	5.22[4]	5.55[4]	6.80[4]	4.65	6.36	4.62	5.22	7.12	4.47	4.70	6.42
††New York (city)	4.42	....	5.27[3]	5.47[5]	....	4.62	....	4.62	5.17	8.42[12]	4.37	4.72	6.35
New York (country)	4.32	....	5.17[3]	5.37[5]	....	4.52	....	4.52	....	....	4.27	....	6.25
Philadelphia (city)	4.34	5.73[9]	5.33[9]	5.29[5]	6.54[5]	4.43	5.28	4.48	5.13	6.87	4.22	4.44	5.93
Philadelphia (country)	4.24	5.63[9]	5.23[9]	5.19[5]	6.44[5]	4.33	5.18	4.38	....	6.60	4.12	4.34	5.83
Baltimore (city)	3.99†	5.50[8]†	5.20[8]†	5.14[5]	6.39[5]	4.40	....	4.45	5.10	....	4.34	4.39	5.90
Baltimore (country)	3.89†	5.40[8]†	5.10[8]†	....	....	....	....	....	....	....	4.24	4.29	5.80
Washington (city)	4.35	....	....	5.18[5]	6.43[5]	4.65	....	4.70	5.60[11]	....	4.60	4.65	6.60
Norfolk, Va.	4.35	....	....	....	....	....	....	4.75	5.50	....	4.50	4.50	6.25
Memphis, Tenn. (city)	4.47[20]	....	5.53[20]†	5.97[5]	....	4.72[20]	....	4.67[20]	5.78	....	4.67[20]	4.92[20]	6.58[20]
Memphis, Tenn. (country)	4.37[20]	....	5.43[20]†	5.87[5]	....	4.62[20]	....	4.57[20]	5.68	....	4.57[20]	4.82[20]	6.48[20]
Buffalo (city)	4.15	....	4.85[6]	5.35[5]	....	4.30	5.25	4.10	4.75	....	4.10	4.55	5.90
Buffalo (country)	4.00	....	4.70[6]	4.95[5]	....	3.90	4.85	3.95	4.60	6.60	3.95	4.10	5.45
Pittsburgh (city)	3.95†	....	4.75[8]†	5.10[5]	6.35[5]	4.05	5.00	4.10	4.75	6.60	4.10	4.25	5.60
Pittsburgh (country)	3.80†	....	4.60[8]†	4.95[5]	6.20[5]	3.90	4.85	3.95	4.60	6.60	3.95	4.10	5.45
Youngstown, O. (city)	4.188	5.338	4.888	5.05	6.30	4.00	....	4.238	5.138	....	4.218	4.488	5.178
Youngstown, O. (country)	....	....	....	4.95	6.20	3.90	....	....	....	....	....	....	....
Detroit	4.05	5.30	4.85‡	5.42	6.67	4.34	5.24	4.20	4.87[12]	7.01	4.42	4.49	5.92
Cleveland (city)	4.15	5.15[8]	4.85[8]	5.238[5]	6.488[5]	4.188	5.10	4.10	4.75	6.858	4.311	4.25	5.961
Cleveland (country)	4.00	5.00[8]	4.70[8]	....	....	3.90	4.95	3.95	4.60	....	....	4.10	....
Cincinnati	4.016	4.816[8]	....	5.166[5]	6.416[5]	4.394	....	4.403	5.053	....	4.444	4.553	5.944
Chicago (city)	4.15	5.15[8]	4.85[8]	5.10[5]	6.35[5]	4.05	5.10	4.10	4.75	6.60[12]	4.10	4.30	5.75
Chicago (country)	4.00	5.00[8]	4.70[8]	4.95[5]	6.20[5]	3.90	4.95	3.95	4.60	6.60[12]	3.95	4.15	5.60
Milwaukee	4.299	5.299[8]	4.999[8]	5.249[5]	6.499[5]	4.199	5.249	4.249	4.899	6.899	4.249	4.449	5.899
St. Paul, Minneapolis	4.284[13]	....	5.084[8]†	5.434[5]	6.684[5]	4.384[12]	....	4.434[13]	5.476[11]	7.084[11]	4.434[13]	4.584[13]	6.084[13]
Indianapolis	4.04	....	4.84[8]	5.29[5]	6.54[5]	4.24	....	4.36†‡	5.26	....	4.36	4.61	6.01
St. Louis	4.699	....	4.899[8]†	5.424[5]	6.674[5]	4.199	....	4.249	5.074[12]	7.074	4.249	3.999	5.899
Birmingham (city)	4.15[20]	....	....	5.25[5]	....	4.15[20]	....	4.15[20]	5.58	....	4.10	4.35	6.56
Birmingham (country)	4.00[20]	....	....	5.10[5]	....	4.00[20]	....	3.95[20]	....	....	3.95	4.20	....
New Orleans	4.68[20]**	....	5.94[8]	....	....	4.88[20]	....	4.83[20]**	5.94[11]	....	4.73[20]**	5.03[20]	6.99[20]
Houston, Tex.	6.00[1]	....	....	6.00	....	6.00[1]	....	5.35[1]	....	6.35	5.85	5.85	6.40
Omaha, Nebr.	4.968	....	....	5.918[5]	7.168[5]	4.868	....	4.918	5.568[11]	....	4.918	5.068	6.568
Los Angeles	5.35	....	7.00[8]	....	7.45[5]	5.65	8.35	5.10	6.90[18]	9.35	5.20	5.10	7.20
San Francisco	4.90[21]	....	6.30[5]	....	7.35[5]	5.20[14]	8.35[14]	4.75[14]	***	9.35[16]	4.90[14]	5.00[14]	6.80[14]
Seattle and Tacoma, Wash.	5.00[17]	....	6.75[5]	6.30[5]	....	5.30[17]	....	5.00[17]	7.10[18]	8.50[13]	4.95[17]	5.15[17]	7.25[17]

Base Quantities: 400 to 1999 pounds except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 pounds and over; [1]—any quantity; [2]—300 to 1999 pounds; [3]—150 to 2249 pounds; [4]—three to 24 bundles; [5]—450 to 1499 pounds; [6]—one bundle to 1499 pounds; [7]—one to nine bundles; [8]—400 to 1499 pounds; [9]—1000 to 1999 pounds; [10]—450 to 39,999 pounds; [11]—1000 to 39,999 pounds; [12]—1000 pounds and over; [13]—400 to 14,999 pounds; [14]—400 to 39,999; [15]—2000 lb and over; [16]—1000 to 4999; [17]—300 to 9999 pounds; [18]—1500 to 1999 pounds; [19]—1500 to 39,999; [20]—400 to 3999 pounds; [21]—400 lb and over.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § as rolled, except New York, Jersey City, Indianapolis and San Francisco where price represents annealed bars; ** add 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡† add 15c for 100 lb for slow moving items; §§ 18 gage and heavier; *** rounds under ⅜ in. 7.00c, ⅜ in. and over 6.50c, squares, hexagons and flats 6 in. and narrower 7.50c, flats over 6 in. 8.25c at San Francisco.

PRICES OF LEADING FERROALLOYS PRODUCTS

Spiegeleisen: 19-21% Mn, 1-3% Si, carlot per gross ton, Palmerton, Pa., $44, Pittsburgh, $48. 16% to 19% Mn, Pittsburgh, $47.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140.25 fob cars, Pittsburgh, including 75c switching charge, (where Carnegie-Illinois Steel Corp. is producer); add $8 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.30c; regular, 21.20c; medium, 15.20c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn) Prices per lb of briquets: Contract, bulk, carlots, 7.00c, packed, carlots, 7.60c, ton lots, 8.00c, smaller lots 8.40c, eastern, freight allowed; 7.25c, 7.85c, 8.60c and 9.00c, central; 7.80c, 8.40c, 10.50c and 10.90c, western; spot up 0.25c; notched, up 0.25c.

Ferrotungsten: Spot, 10,000 lb or more, per lb contained W, $2.27; contract, $2.25; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; smaller lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum C; per lb contained Ti; ton lots $1.35; smaller lots $1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High-Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

Ferrovanadium: V 0.35-0.55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 13.80c, ton lots 14.30c, smaller lots 14.80c; 75%, c.l. 11.05c, ton lots 11.65c, smaller lots 12.25c; 50%, c.l. 9.00c, ton lots 9.65c, smaller lots 10.30c. Deduct 1.00c for bulk, carlots, 80-90% and 90-95%; 1.05c, 75%; 1.20c, 50%. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%.

Ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) Prices per lb of alloy, contract, ton lots $1.20, smaller lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Ferrocolumbium: 50-60%, per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.50; smaller lots $2.55. Spot up 10c.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 16.20c, ton lots 16.80c; central zone, add 0.40c and 1.30c; western zone, add 0.55c and 2.10c. Deduct 0.60c for bulk carlots. **High carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c. **Low carbon,** eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22.50c, 0.15% 22.00c, 0.2% 21.75c; 0.5% 21.50c, 1% 21.00c, 2% 20.50c; add 1.35c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l.; and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carlot packed differential 0.80c. Prices are per lb of contained Cr, freight allowed.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C above 5-7%.) Contract, 2-inch x D, packed, eastern zone, freight allowed, c.l. 17.05c, ton lots 17.60c, smaller lots 18.30c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, high carbon: (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 17.30c, ton lots 17.90c, smaller lots 18.60c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Prices are per pound of contained chromium, spot prices 0.25c higher. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk 21.00c; packed carlot 21.80c, ton lots 22.35c, smaller lots 23.35c, eastern, freight allowed, per pound of contained Cr; 21.40c, 22.20c, 23.00c, and 24.00c, central; 21.50c, 22.30c, 24.20c and 25.20c, western spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 10.35c, ton lots 10.75c, smaller lots 11.15c; central zone, add 0.25c for c.l. and 0.90c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.50c for bulk carlots. Prices per pound of briquets; spot prices 0.25c higher; notched 0.25c higher.

Chromium Metal: 97% min. Cr, max. 0.50% C, eastern zone, per lb contained Cr bulk, c.l. 79.50c, 2000 lb c.l. 80c; central 81c and 82.60c; western 82.25c and 84.75c, fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) Contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal; cast: Contract, ton lot or more, $1.60; 100 to 1999 lb, $1.95; less than 100 lb, $3.15 per lb of metal, eastern zone; $1.615, $1.965 and $3.185, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, packed, 16.10c, ton lots 17.60c, smaller lots 18.60c, eastern, freight

allowed; 16.60c, 18.45c, 19.45c, central; 18.65c, 20.20c, 21.20c, western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, lump, packed, carlots 14.60c, ton lots 16.10c, smaller lots 17.10c, eastern, freight allowed; 15.10c, 16.85c, 17.85c, central; 17.15c, 19.00c, 20.00c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 14.50c; 2000 lb to c.l. 16.00c; central zone, 15.10c and 18.25c; western, 15.70c and 20.00c; min. 96% Si and max. 2% Fe, eastern, bulk, c.l., 14.10c; 2000 lb to c.l. 15.60c; central, 14.70c and 17.85c; western, 15.30c and 19.60c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese Briquets: Containing exactly 2 lb Mn and about ½ lb Si, eastern zone, bulk, c.l. 6.75c, ton lots 7.75c; central zone, add 0.25c for c.l. and 0.60c for ton lots; western, add 0.80c for c.l. and 2.50c for ton lots. Notched, up 0.25c.

Silicon Briquets: Weighing about 5 lb and containing exactly 2 lb Si, packed, eastern zone, c.l. 4.70c, ton lots 5.10c, smaller lots 5.50c; weighing about 2½ lb and containing 1 lb Si, packed, eastern zone, c.l. 4.85c, ton lots 5.25c, smaller lots 5.65c; notched 0.25c higher; central zone, add 0.25c for c.l. and 0.60c for smaller lots; western zone, add 0.45c for c.l. and 0.90c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.50c for bulk carlots.

Manganese Metal: (Min. 96% Mn., max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32.00c; central 31.00c and 33.45c; western, 31.45c and 34.40c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) Prices per lb of alloy. Contract, ton lots $1.89, less $2.01, eastern, freight allowed; $1.903 and $2.023, central; $1.935 and $2.055, western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance). Prices per lb of alloy: Contract, 5 tons or more $1.90, 1 ton to 5 tons $2.00, smaller lots $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si; $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%) Prices per lb of alloy, contract, or spot carlots 35.00c, ton lots 37.00c, smaller lots 39.00c, eastern, freight allowed; 35.30c, 38.10c and 40.10c, central; 35.30c, 40.05c and 42.05c, western; spot up 0.25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) Price per lb of alloy, contract, carlots 13.50c, ton lots 14.25c, smaller lots 15.00c, eastern zone, freight allowed; 13.80c, 15.35c, 16.10c, central; 13.80c, 17.30c, 18.05c, western; spot up 0.25c.

CMSZ Alloys 4 & 5: (Alloy 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3.00-4.50%; alloy 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%). Prices per lb of alloy, contract or spot, bulk, carlots 14.50c; packed, carlots 15.25c, ton lots 16.00c, smaller lots 16.75c, eastern, freight allowed; 14.80c, 15.55c, 17.10c, 17.85c, central; 14.80c, 15.55c, 19.05c, 19.80c, western.

Zirconium alloy: 12-15%, per lb of alloy, eastern, contract, bulk, carlots 5.50c, packed, carlots 6.05c, ton lots 6.40c, smaller lots 6.75c; spot up 0.25c.

Zirconium alloy: Z 35-40%, eastern, contract, packed, carlots 17.00c, ton lots 17.75c, smaller lots 19.00c; spot up 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb 6.25c; ton lots 6.75c; smaller lots 7.25c. Spot up ½c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed

Tungsten Metal Powder: Spot, not less than 98.8%, $2.90, freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5.84% Na_2O; or air dried, 83-85% V_2O_5 and 5.15% Na_2O, $1.10 per lb contained V_2O_5 fob plant freight allowed on quantities of 25 lb and over to St. Louis.

Nonferrous Metal Prices Remain Steady

Copper and lead users take all offerings . . . Aluminum and zinc stocks rise

NEW YORK—In sharp contrast with the strong price tone which developed in nearly all ferrous metal markets last week, steadiness continued to characterize the nonferrous metal markets. Needs of copper, lead and zinc consumers are being filled fairly satisfactorily, eliminating buying pressure at least for the next few weeks when many of their plants will be closed for vacations.

COPPER—Demand for copper has shown the normal seasonal decline, although wire mills are still taking fair tonnages. Brass mills are covering needs for August. Prices were unchanged last week at 21.50c, Connecticut, for electrolytic. Export copper was quoted 21.50c. fas New York. Exports of refined copper from the United States in May totaled 10,908 tons compared with 8470 tons in April, according to the Bureau of the Census. Of the May exports, 4861 tons were shipped to the United Kingdom, 1702 tons to Sweden, and the balance to scattered destinations.

BRASS and BRONZE INGOTS—Secondary copper smelters produced 29,204 short tons of brass ingot in March, according to the Bureau of Mines. Early in March refiners raised their selling price of electrolytic copper to 21.50c a pound and, as a result, prices of red metal scrap and brass ingot were also increased. This did not cause ingot makers in general to increase their stocks of scrap or to speed up their operations.

BERYLLIUM-COPPER — Price of beryllium-copper alloy, 3.75 to 4.25 per cent, rose $2.25 a pound last week to the basis of $17 a pound of contained beryllium. The advance was attributed by Beryllium Corp. to the increased cost of beryl ore.

LEAD—Total stocks of lead held by smelters and refiners as of June 1 declined 7015 tons to 168,737 tons, the smallest reported since July 1, 1946, according to the American Bureau of Metal Statistics. The decline was caused by a sharp drop in stocks of ore and matte and in process at smelters, which dropped to 92 998 tons on June 1 or about 12,590 tons less than the May 1 figure. This decline was partly offset by a gain in stocks in base bullion which rose from 6484 tons on May 1 to 11,361 tons on June 1. Total in process at refineries amounted to 12,912 tons compared with 14,892 tons on May 1. Stocks of antimonial lead increased about 360 tons to 10,463.

Total receipts of lead in ore and scrap by smelters only declined during May to 43,193 tons from 49,451 tons in April. The total for the first five months was 221,861 tons compared with only 171,396 tons in the like 1946 period. Receipts of domestic lead in ore in May totaled 34,269 tons, or about 3310 tons less than in the preceding month, bringing the total for the first five months to 171,242 tons compared with 133,860 tons in the like period of last year. Receipts of foreign metal dropped sharply to 2051 tons in May from 6713 tons in April while receipts of lead in scrap increased to 6873 tons from 5157 tons in April.

Demand for lead continues in excess of supplies, forcing sellers to continue allocation of production. August books are being filled gradually, those for July having been closed in most instances.

ZINC—Smelter production of zinc held steady in May while domestic shipments continued to decline. Shipments on export and drawback accounts were in good volume, holding the increase in stocks at the end of May to about 7500 tons. Production at smelters totaled 70,990 tons in June, or at a daily rate of 2366 tons, compared with 73,970 tons in May, or at a daily rate of 2386 tons. Total production in the first five months amounted to 131,757 tons, or about 51,000 tons larger than in the like period of last year. Shipments to domestic consumers in June totaled 52,390 tons, a decline of about 6500 tons from May and an increase of 1289 tons over the June, 1946, total. Domestic shipments for the first six months totaled 372,824 tons, an increase of about 46,000 tons over the total for the like 1946 period. Export and drawback shipments amounted to 11,137 tons in June against 11,976 tons in May, bringing the total for the first half to 60,406 tons compared with only 17,882 tons for the like 1946 period.

As a result of the drop in domestic shipments in June, smelter stocks rose about 7500 tons to 174,327 tons at the end of the month compared with 239,953 tons at the end of June, 1946. Unfilled orders on producers' books totaled 46,029 tons at the end of June, representing a decline of 5400 tons from the total at the end of May. The order backlog is now the smallest since September, 1946, when it amounted to 42,186 tons.

TIN—Combined Tin Committee has recommended interim allocations of 11,331 tons of pig tin among 23 nations during the second half of this year. Further allocations will be announced about Aug. 20 when greater supplies become available. The allocations were in part as follows: United States, 6759 tons; France, 1515 tons; Italy, 657; India, 525; and Canada 300.

The Longhorn smelter at Texas City, Tex., produced 2712 tons of tin in June compared with 3112 tons in May and 3856 tons in June, 1946. This is the smallest for any month since 1944 and the total for the first half was also the smallest since that year. Peak output was reached in May, 1946, at 3904 tons.

ALUMINUM—Production of primary aluminum increased to 53,032 net tons in March from 47,032 tons in February and only 26,000 tons in March, 1946. Output was the largest since March, 1945. Stocks at the end of March totaled 30,354 tons compared with 17,565 tons at the end of January, according to the Bureau of Mines. Although apparent consumption continued at a high rate, there were growing indications of a slackening in demand that point toward a nearby contraction in production.

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 21.50c, delivered Conn.; Lake, 21.62½c, del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 18.00c; 88-10-2 (No. 215) 26.25c; 80-10-10 (No. 305) 22.00c; No. 1 yellow (No. 405) 14.50c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 13.75c; No. 12 foundry alloy (No. 2 grade) 13.25c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 14.50c; grade 2 (92-95%) 12.50c; grade 3 (90-92%) 11.75c; grade 4 (85-90%) 11.00c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00c-56.00c; 25 to 99 lb, 42.00c-46.00c; 100 to 4000 lb, 35.00c-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 80.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl. 79.55c; Grade D, 99.50-99.64% incl., 79.40c; Grade E, 99-99.49% incl. 78.90c; Grade F, below 99% (for tin content), 78.70c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35.00c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $84-$87 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb

Beryllium-Copper: 3.75-4.25% Be, $17 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb, del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 lb for 550 lb (keg); $1.67 lb for 100 lb (case); $1.72 lb under 100 lb

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 64.75c, per ounce.

Platinum: $53-$56 per ounce.

Paladium: $24 per troy ounce.

Iridium: $80-$90 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 33.68c; yellow brass 29.63c; commercial bronze, 95% 33.72c, 90% 33.11c, red brass, 85% 31.99c, 80% 31.38c; best quality 30.64c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 38.44c; nickel silver, 18%, 42.49c; phosphor bronze, grade A, 5%, 52.00c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.39c; commercial bronze, 95% 33.41c, 90% 32.80c; red brass, 85% 31.68c, 80% 31.07c; best quality 30.33c.

Seamless Tubing: Copper 33.72c; yellow brass 32.39c; commercial bronze 90% 35.52c; red brass 85% 34.65c, 80% 34.04c; best quality brass 33.05c.

Wire: Yellow brass 29.92c; commercial bronze, 95% 34.01c, 90% 33.40c; red brass, 85% 32.28c, 80% 31.67c; best quality brass 30.93c.

Copper Wire: Bare, soft, fob eastern mills, carlots 27.72c, less carlots 28.22c; weatherproof, fob eastern mills carlots 28.12c, less carlots 28.62c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq. ft; 75c, 10 to 20 sq ft and circles.
Pipe: Full coils 17.50c; cut coils 17.75c.
Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 29.84c; oval, 29.34c; electrodeposited, 29.09c; cast, 28.84c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 500 lb, 93.50c; less than 200 lb, 94.00c; ball, 1000 lb and over, 94.75c; 500 to 1000 lb, 95.25c; 200 to 500 lb, 95.75c; less than 200 lb, 96.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbls., 60.00c; 100 lb kegs, 60.50c.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.00c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb, 45.50c; 1000 to 1999, 46.50c; 600 to 999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)

Prices for less than 15,000 lb fob shipping point. Add ⅝c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A. B.	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 17.00, No. 2 copper 15.50, light copper 14.00, composition red brass 12.75, auto radiators 9.50, heavy yellow brass 8.75, brass pipe 9.25.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 17.00-17.50c, No. 2 copper, 15.50-16.00, light copper, 14.50-15.00, refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 13.62½.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire, No. 1 15.00-15.50, No. 2 13.75-14.00, light copper 12.50-13.00; No. 1 composition turnings 10.00-10.50, mixed brass turnings 5.50-6.00, new brass clippings 12.00-12.50, No. 1 brass rod turnings 10.50-11.00, light brass 4.75-5.00, heavy yellow brass 6.50-7.00, new brass rod ends 11.00-11.50, auto radiators, unsweated 8.50-8.75, cocks and faucets 8.50-9.00, brass pipe 8.25-8.50.

Lead: Heavy lead 10.50-11.00, battery plates 6.00-6.25, linotype and stereotype 12.25-12.50, electrotype 10.75-11.00, mixed babbitt 11.00-11.50, solder joints 15.50-16.00.

Zinc: Old zinc 5.00-5.50, new die cast scrap 3.75-4.00, old die cast scrap 2.00-2.50.

Tin: No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 40.00-42.00, siphon tops 40.00-42.00.

Aluminum: Clippings, 2S, 8.00-8.50, old sheets 5.00-5.50, crankcase 4.00-4.50, borings and turnings 2.00, pistons, free of struts, 4.00-4.50.

Nickel: Anodes 18.50-19.00, turnings 15.50-16.50, rod ends 18.00-19.00.

Monel: Clippings 13.00-14.00, turnings 7.50-8.00, old sheet 11.00-12.00, rods 11.50-12.50, castings 9.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$35.00-35.50
No. 2 Heavy Melt. Steel	35.00-35.50
No. 1 Busheling	35.00-35.50
Nos. 1, 2 & 3 Bundles	35.00-35.50
Machine Shop Turnings	30.00-30.50
Mixed Borings, Turnings	30.00-30.50
Short Shovel Turnings	32.00-32.50
Cast Iron Borings	31.00-31.50
Bar Crops and Plate	**39.00-40.00**
Low Phos. Cast Steel	**39.00-40.00**
Punchings & Plate Scrap	**39.00-40.00**
Cut Structurals	**39.00-40.00**
Elec. Furnace Bundles	**39.00-40.00**
Heavy Turnings	**31.00-31.50**
No. 1 Chemical Borings	**31.00-32.00**

Cast Iron Grades

No. 1 Cupola	**40.00-41.00**
Charging Box Cast	**35.00-35.50**
Heavy Breakable Cast	**34.00-34.50**
Stove Plate	**37.50-38.00**
Unstripped Motor Blocks	**37.50-38.00**
Malleable	48.00-49.00
Brake Shoes	**35.00-36.00**
Clean Auto Cast	**40.00-41.00**
No. 1 Wheels	**42.00-42.50**
Burnt Cast	**35.00-36.00**

Railroad Scrap*

No. 1 R.R. Heavy Melt.	38.50-39.00
R.R. Malleable	48.00-49.00
Axles	40.00-41.00
Rails, Rerolling	37.00-37.50
Rails, Random Lengths	39.00-39.50
Rails, 3 ft and under	40.50-41.00
Rails, 18 in. and under	42.00-42.50
Railroad Specialties	44.00-44.50
Uncut Tires	39.00-40.00
Angles, Splice Bars	39.00-40.00

* **Brokers buying prices.**

CLEVELAND

No. 1 Heavy Melt. Steel	$37.50-38.00
No. 2 Heavy Melt. Steel	37.50-38.00
No. 1 Busheling	37.50-38.00
Nos. 1 & 2 Bundles	37.50-38.00
Machine Shop Turnings	30.00-30.50
Mixed Borings, Turnings	31.50-32.00
Short Shovel Turnings	31.50-32.00
Cast Iron Borings	31.50-32.00
Bar Crops and Plate	40.00-40.50
Cast Steel	45.00-46.00
Punchings & Plate Scrap	40.00-40.50
Elec. Furnace Bundles	39.00-39.50
Heavy Turnings	37.00-37.50
Alloy Free Turnings	31.00-31.50
Cut Structurals	40.00-40.50

Cast Iron Grades

No. 1 Cupola	46.00-48.00
Charging Box Cast	42.00-44.00
Stove Plate	40.00-42.00
Heavy Breakable Cast	40.00-42.00
Unstripped Motor Blocks	43.00-44.00
Malleable	56.00-57.00
Brake Shoes	42.00
Clean Auto Cast	47.00
No. 1 Wheels	45.00
Burnt Cast	40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	39.00-39.50
R.R. Malleable	56.00-57.00
Rails, Rerolling	44.00-45.00
Rails, Random Lengths	44.00-45.00
Rails, 3 ft and under	46.00-47.00
Railroad Specialties	46.00
Uncut Tires	44.00
Angles, Splice Bars	47.00

VALLEY

No. 1 Heavy Melt. Steel	$35.00-38.00
No. 2 Heavy Melt. Steel	35.00-38.00
No. 1 Bundles	35.00-38.00
Machine Shop Turnings	31.00-31.50
Short Shovel Turnings	31.50-32.00
Cast Iron Borings	31.50-32.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	39.00-39.50

MANSFIELD

No. 1 Heavy Melt. Steel	$33.00-34.50
Machine Shop Turnings	31.00-31.50
Short Shovel Turnings	31.00-31.50

CINCINNATI

No. 1 Heavy Melt. Steel	$33.00
No. 2 Heavy Melt. Steel	33.00
No. 1 Busheling	33.00
No. 1 Bundles	33.00
No. 2 Bundles	33.00
Machine Shop Turnings	27.00
Mixed Borings, Turnings	26.00
Short Shovel Turnings	29.00
Cast Iron Borings	28.00

Cast Iron Grades

No. 1 Cupola Cast	44.00
Charging Box Cast	36.00
Heavy Breakable Cast	37.50
Stove Plate	34.00
Unstripped Motor Blocks	36.00
Brake Shoes	33.00
Clean Auto Cast	43.00
Drop Broken Cast	46.00

Railroad Scrap

No. 1 R.R. Heavy Melt	37.00
R.R. Malleable	50.00
Rails, Rerolling	41.00
Rails, Random Lengths	41.00
Rails, 18 in. and under	46.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$29.50-30.00
No. 1 Busheling	29.50-30.00
Nos. 1 & 2 Bundles	29.50-30.00
No. 3 Bundles	29.50-30.00
Machine Shop Turnings	23.50-24.00
Mixed Borings, Turnings	23.50-24.00
Short Shovel Turnings	25.00-25.50
Cast Iron Borings	25.00-25.50
Punchings & Plate Scrap	33.00-33.50

Cast Iron Grades

No. 1 Cupola Cast	**33.00-34.00**
Heavy Breakable Cast	**25.00-27.00**
Clean Auto Cast	**33.00-34.00**

BUFFALO

No. 1 Heavy Melt. Steel	$33.00-34.00
No. 2 Heavy Melt. Steel	33.00-34.00
No. 1 Busheling	33.00-34.00
Nos. 1 & 2 Bundles	33.00-34.00
Machine Shop Turnings	**23.50-24.00**
Mixed Borings, Turnings	**23.50-24.00**
Cast Iron Borings	**23.50-24.00**
Short Shovel Turnings	**24.00-25.00**
Punchings & Plate Scrap	**35.00-36.00**
Elec. Furnace Bundles	**37.00-38.00**

Cast Iron Grades

No. 1 Cupola Cast	35.00-38.00
Heavy Breakable Cast	33.00-34.00
Malleable	38.00-39.00
No. 1 Wheels	35.00-36.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$37.00-38.00
No. 2 Heavy Melt. Steel	37.00-38.00
No. 1 Busheling	37.00-38.00
No. 1 Bundles	37.00-38.00
No. 2 Bundles	36.00-37.00
No. 3 Bundles	33.50-34.00
Machine Shop Turnings	29.00-30.00
Mixed Borings, Turnings	27.00-28.00
Short Shovel Turnings	30.00-31.00
Bar Crops and Plate	40.50-41.50
Punchings & Plate Scrap	40.50-41.50
Cut Structurals	40.00-40.50
Elec. Furnace Bundles	38.50-39.50
Heavy Turnings	36.00-37.00
No. 1 Chemical Borings	32.00-33.00

Cast Iron Grades

No. 1 Cupola Cast	**46.00-47.00**
Charging Box Cast	**45.00-46.00**
Heavy Breakable Cast	**45.00-46.00**
Unstripped Motor Blocks	41.00-41.50
Malleable	52.00-53.00
Clean Auto Cast	**45.00-46.00**
No. 1 Wheels	**45.00-46.00**

NEW YORK

(Dealers buying prics, fob shipping point)

No. 1 Heavy Melt. Steel	$32.50-32.85
No. 2 Heavy Melt. Steel	32.50-32.85
No. 1 Busheling	32.50-32.85
Nos. 1 & 2 Bundles	32.50-32.85
No. 3 Bundles	30.00
Machine Shop Turnings	23.00-23.50
Mixed Borings, Turnings	23.00-23.50
Short Shovel Turnings	24.50-25.00
Punchings & Plate Scrap	33.00-34.00
Cut Structurals	33.00-34.00
Elec. Furnace Bundles	33.00-33.50
No. 1 Chemical Borings	24.50-25.00

Cast Iron Grades

No. 1 Cupola Cast	**41.50-42.00**
Charging Box Cast	**41.50-42.00**
Heavy Breakable	**41.50-42.00**
Unstripped Motor Blocks	**35.00-36.00**
Malleable	**46.00-48.00**

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$31.50-32.00
No. 2 Heavy Melt. Steel	31.50-32.00
Nos. 1 & 2 Bundles	31.50-32.00
No. 1 Busheling	31.50-32.00
Machine Shop Turnings	24.50-25.00
Mixed Borings, Turnings	23.00-24.00
Short Shovel Turnings	27.00-27.50
Bar Crops and Plate	34.00-35.00
Punchings & Plate Scrap	34.00-35.00
Chemical Borings	24.00-25.00

Cast Iron Grades

No. 1 Cupola Cast	**40.00-42.00**
Charging Box Cast	**38.00**
Heavy Breakable Cast	**36.00-37.00**
Stove Plate	31.00-32.00
Unstripped Motor Blocks	**30.00**
Clean Auto Cast	**40.00**

CHICAGO

No. 1 Heavy Melt. Steel	$33.50-34.00
No. 2 Heavy Melt. Steel	33.50-34.00
Nos. 1 & 2 Bundles	33.50-34.00
No. 3 Bundles	30.50-31.00
Machine Shop Turnings	28.50-29.00
Mixed Borings, Turnings	28.50-29.00
Short Shovel Turnings	28.50-29.00
Cast Iron Borings	28.50-29.00
Bar Crops and Plate	35.50-36.00
Cast Steel	34.50-35.00
Punchings	35.50-36.00
Elec. Furnace Bundles	33.50-34.00
Heavy Turnings	30.50-31.00
Cut Structurals	35.50-36.00

Cast Iron Grades

No. 1 Cupola Cast	37.00-41.00
Malleable	38.00-41.00
Clean Auto Cast	37.00-41.00
No. 1 Wheels	39.00-41.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	34.50-35.00
Rails, Rerolling	40.00-41.00
Rails, Random Lengths	35.50-36.50
Rails, 3 ft. and under	40.00-41.00
Rails, 18 in. and under	42.00-43.00
Railroad Specialties	39.00-40.00
Angles, Splice Bars	39.00-40.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$32.50-33.50
No. 2 Heavy Melt. Steel	**30.00-31.00**
Machine Shop Turnings	24.00-26.00
Short Shovel Turnings	27.00-28.00

Cast Iron Grades
(Fob shipping point)

No. 1 Cupola Cast	**38.00-40.00**
Charging Box Cast	32.00-34.00
Heavy Breakable Cast	**30.00-31.00**
Stove Plate	**29.00-32.00**
Brake Shoes	**36.00-38.00**
Clean Auto Cast	**39.00-40.00**
No. 1 Wheels	**38.00-40.00**
Burnt Cast	29.00-32.00

Railroad Scrap

R.R. Malleable	50.00-52.00
Rails, Rerolling	37.50-40.00
Rails, Random Lengths	35.00-37.00
Rails, 3 ft and under	40.00-42.00
Uncut Tires	34.50-35.50
Angles, Splice Bars	36.00-38.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	**$31.00**
No. 2 Heavy Melt. Steel	**31.00**
No. 1 Busheling	**31.00**
Nos. 1 & 2 Bundles	**31.00**
No. 3 Bundles	**25.00**
Long Turnings	**22.00**
Short Shovel Turnings	**24.00**
Cast Iron Borings	**23.00**
Bar Crops and Plate	**32.00-33.00**
Punchings & Plate Scrap	**36.00-37.00**
Cut Structurals	**36.00-37.00**

Cast Iron Grades

No. 1 Cupola Cast	**38.00-39.00**
Stove Plate	**34.00-35.00**
No. 1 Wheels	**32.00-32.50**

Railroad Scrap

No. 1 R.R. Heavy Melt.	**32.00**
R.R. Malleable	**37.50-38.00**
Axles, Steel	**33.00**
Rails, Rerolling	**36.00-37.00**
Rails, Random Length.	**30.00-31.00**
Rails, 3 ft and under	**32.00-33.00**
Angles and Splice Bars	**32.00-33.00**

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$19.04
No. 2 Heavy Melt. Steel	*19.04
No. 1 Busheling	*19.04
Nos. 1 & 2 Bundles	*19.04
No. 3 Bundles	*17.04
Machine Shop Turnings	*12.54
Bar Crops and Plate	18.00
Cast Steel	18.00
Alloy Free Turnings	8.00
Cut Structurals	20.00-20.50
Tin Can Bundles	17.00

Railroad Scrap

Axles	26.50
Rails, Random Lengths	21.00
Uncut Tires	28.00

*Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Busheling	20.00
Nos. 1 & 2 Bundles	20.00
No. 3 Bundles	18.00
Machine Shop Turnings	11.50
Mixed Borings, Turnings	11.50
Punchings & Plate Scrap	21.50
Cut Structurals	21.50

Cast Iron Grades

No. 1 Cupola Cast	27.50
Charging Box Cast	22.50
Heavy Breakable Cast	21.50
Stove Plate	23.00
Unstripped Motor Blocks	21.50
Malleable	27.50
Brake Shoes	27.50
Clean Auto Cast	27.50
No. 1 Wheels	24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Railroad Malleable	27.50
Rails, Random Lengths	20.00
Angles and Splice Bars	21.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
Nos. 1 & 2 Bundles	19.50
Machine Shop Turnings	14.50
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	27.50
Elec. Furnace Bundles	27.0

Cast Iron Grades

No. 1 Cupola Cast	30.00

Sheets, Strip . . .

Empire Steel Corp. raises long ternes to basis of 4.00c Pittsburgh

Sheet Prices, Page 146

Pittsburgh—Sheet and strip output is not expected to be in balance with demand until first quarter of next year at the earliest, despit fact several new cold-reduction mills probably will be in operation by fourth quarter. Only a few customers to date have held up shipment of a portion of monthly allotments because of adequate inventory position in relation to projected production schedules. When an occasional gap in rolling schedules does develop, it is immediately taken up by other consumers who are in urgent need of the material. Producers contend that if they were to open books for extended delivery scheduling they would be booked though first half next year. Most metalworking companies are taking advantage of two week vacation period shutdowns to balance output inventories.

Empire Steel Corp. has advanced base price on long ternes $9 a ton, to 4.00c a pound, Pittsburgh.

Steel producers state recent coal contract will result in further sharp increase in production costs. They contend some major steel items again are selling at a loss, while margin of profit is but a few cents on others. Sheet and srip output was unaffected by the coal pinch during period of miners' vacation.

Boston—If all the flat-rolled products allocated is delivered in third quarter, there will still be shortages based on planned schedules with the resumption of output at metalworking shops slowed by holiday closings. Although there are spot openings for cold-rolled strip, the volume available beyond quotas in both sheets and strip is small and unpredictable. This continued stringency in flat-rolled steel is the result of several factors, the primary one being that consumer demands are far in excess of prewar levels, covering a wider range of grades in addition to increases in hot and cold-rolled carbon. This demand includes boosts in electrical, enameling, galvanized and other specialties; only stainless supply balances demand and this is due to production rather than any material slump in demand. Further complicating the shortages is the matter of distribution; mills formerly disposing of substantial tonnages in this area have withdrawn or curtailed volume and in some cases buyers have been unable to locate a substitute or replacement source under the quota or allocation programs.

New York—Third quarter sheet allocations, geared to high estimated production, probably will be met for the most part, but only uninterrupted output during the balance of the period will make this possible. Some tonnage was lost during the coal crisis, but less in sheets than in most other products. Pressure for deliveries is strong, most shops consuming flat-rolled operating with limited inventories. Demand is notably strong from the automotive, car building and small tank shops. Mill backlogs are heavy and slight, if any, inroad is being made on order books; only stainless is in relative balance with demand. Galvanized and hot-rolled pickled are the most critical. Some producers of narrow cold strip have been down, thus building a better balance in hot strip inventories, although various individual sizes and grades are not available until September rollings. If all deferments stick, some ranging through August, scattered space will be open for fourth quarter and possibly late third for cold-rolled low-carbon strip.

Scott Industries, 437 10th avenue, New York, has offered 15,000 tons of 16-26 gage, buyers' option, hot-rolled pickled prime sheets at $183 a ton, fob Pittsburgh area. In a circular, the seller offered to put up $1 a ton as forfeit for non-delivery.

Philadelphia—Delivery schedules with most producers have been set back to some degree, although recent suspensions, most prevalent in primary steelmaking, affected flat rolled less than other finished steel products. Extensions range up to one month on third quarter volume in some instances with September tonnage going to October, the latter month being blanked out as far as new volume is concerned. Most mills are not set back to this extent but will be pushed to meet current quarter commitments fully. Meanwhile there are few chances for acceptance of additional orders and some tonnage is already in fourth quarter although books have not been formally opened. Stainless is an exception, but all other grades and finishes—electrical, galvanized and hot-rolled pickled—are included. Demand for silicon and enameling sheets is running far ahead of prewar demand and inventories with consumers are limited. Producers of electric sheets on a monthly quota basis generally are on a 90-day lead time.

Cleveland—Seasonal lull in operations at metalworking plants has not been reflected in the sheet and strip steel market. Consumers would take two or three times as much tonnage as is being offered by mills and have given no indication that they will want less over the balance of this year. With demand far in excess of production, sellers expect to continue the present voluntary allocation system for a year ahead.

Chicago—Despite the fact that many manufacturing plants in the Middle West are closing for short periods for mass vacations, sheet and stripmakers report they are receiving no requests for holding up shipments of steel. Furthermore, cancellations are virtually nonexistent. Theory is that consumers propose to take in and stock every pound of steel they can lay hands on, this to insure higher level plant operations after vacations end. Consumers may also be figuring to beat an early price advance in sheets and strip.

Cincinnati—Production at district sheet mills is being sustained at high levels. Fuel stocks were adequate to bridge the coal miners' vacation period, but any considerable lag now in shipments, from whatever cause, will bring an early curtailment. Third quarter schedules were predicated on uninterrupted high level of output, with no free tonnage available in case of curtailment.

Birmingham—Temporary easing in pressure for sheet delivery is attributed largely to the Independence Day holiday and scattered vacation schedules over the district. Ultimate need for sheets is as great as ever.

Steel Bars . . .

Bar Prices, Page 146

New York—Although not general, scattered spot offerings in hot-rolled carbon bars, under one inch, are appearing and one producer revised part of a warehouse quota from large sizes to smaller, also under one-inch. However, most small sizes high-carbon flats are limited in supply, with indications these at least will be allocated at about current levels for fourth quarter. Despite the apparent improvement, most mills have no tonnage on many sizes of hot-rolled carbon bars beyond third quarter quotas, and some production was lost as the quarter opened. Cold finished in even the smaller sizes is easing with indications this quarter will see a balance in supply and demand in all but a few. Alloys are moving slowly with warehouses and ample tonnage is available for current demand.

Philadelphia—Carbon steel bars continue to ease slightly in lower ranges of sizes, but there are shortages in smaller rounds and flats, notably high carbon in the latter. Cold-finished bars are gradually getting into balance and for some larger and medium sizes producers are seeking orders. The same is true of alloys and tool steel. Pressure for bar stock is slackening except for tight spots indicated. Backlogs in cold finished are somewhat lower with some producers ranging about three months with indication of more tonnage available for fourth quarter.

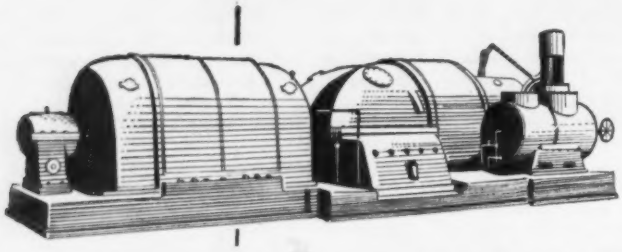
Plates . . .

Plate Prices, Page 147

New York—Freight car building requirements hamper broader distribution of plates, and while deliveries have been heavy, in excess of shop schedules in some instances, others are pressing for monthly allotments to keep pace with other steel components. One eastern car builder could use several thousand tons additional. There is some dissatisfaction over the distribution of this car tonnage, but part is traceable to changes in production schedules covering different types of cars, hoppers, tank and other freight carriers; currently heat is on for an increase in tank car assembly. Considerable plate tonnage has been lost at the start of this quarter. Plate mills are filled for the period and some beyond, although forward commitments being made selectively. Large pipe and tank building requirements are heavy, generally in excess of quotas and volume available.

Philadelphia—Better than 15 per cent of current production by some plate mills is going to railroad car builders with rolling units again back in production following vacation suspensions. With schedules full for this quarter and substantial tonnage in for the fourth, producers are increasingly cautious in making additional forward commitments. In view of expected heavy demand for tank, large pipe and miscellaneous fabricating, production losses of late have extended deliveries in some instances and no progress is being made against backlogs. Demand for floor plates is in proportion with plates, but deliveries are much better, ranging from six to e weeks.

Chicago—Demand for steel plates holds heavy and shipments from mills under quotas fail to meet the requirements of fabricators. Pressure for faster shipments and increased allocations come from all consumers, including tank builders, pipe line fabricators and heavy machinery manufacturers. Mills have been meeting the schedules for freight car shops. Car production in June was



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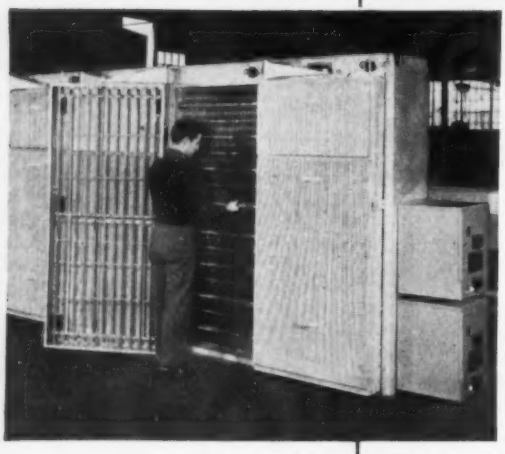

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only about 5500 cars, while steel had been furnished for 7500. Schedule for July had been projected as 10,000, and unless car builders come close to this figure, mills may be unwilling to hold plate shipments at present level. Coming into the picture also is a tank car program to put a further strain on plates. Feeling of plate makers is that too much of the country's steel is finding its way into export.

Birmingham—Except for the apparently inevitable slowing down process incident to the summer months, and the effect of scattered vacation schedules, demand for steel plates continues unabated. Production was not affected by the situation in coal. Tank production and shipbuilding continue to account for a large proportion of the tonnage.

Seattle—Plates are in strong demand, shops being unable to obtain sufficient materials for business offered. For this reason, orders are confined to smaller jobs in line with available supplies.

Tubular Goods . . .

Tubular Goods Prices, Page 147

Philadelphia—Lack of skelp and semifinished material is severely hampering production with nonintegrated pipe and tubing producers, and with hardly an exception merchant steel pipe suppliers are unable to improve tonnage or increase quotas. Demand is heavy from utilities and industrial users. Unable to place orders with mills for direct shipment, distributors report stocks are kept down by abnormally high demand. One mill concentrating on butt weld has balanced semifinished for that schedule and is now able to establish quotas by sizes.

Seattle—Seattle opened bids last week for 3,000 tons of cast iron pipe, various sizes, for resale to contractors on local improvements. Hugh G. Purcell, Seattle, and the Crane Co., Chicago, submitted offers for cast iron while Johns-Manville Co., New York, offered transite at $79,537 less than cast iron.

Wire . . .

Wire Prices, Page 147

Boston—Only in scattered spots, generally for products on which retail pipelines have been filled, is there any easing in wire supply for the fabrication of manufactured goods. For the most part, there is no improvement in sight for third quarter with producers holding strictly to allocations and frequently turning down orders beyond. Not until the rod supply improves to the extent more grades for finishing are available are numerous specialties in low and high corbon likely to get into balance with demand. Wire entering into goods required for other manufactured products, screws, springs and others, is short, although in the case of screws there is some slackening in buying of that item and better deliveries are quoted on some sizes and grades.

New York—In a few cases, wire mills are shipping more steel than is being booked, but these appear to be exceptions with backlogs heavy in many specialties. Music wire has eased substantially, and orders are slower in some directions where inventories have reached a satisfactory point. Volume with spring-makers is more spotty, although clock spring wire holds up well. Most wires entering into automobile production, including

valve spring, are under pressure. Although wire nail output this year stands to break a record, around 865,000 tons, the shortages with distributors is acute. Production increases in the east have been less than in other areas and some mills are not inclined to absorb high freight charges.

Birmingham—Wire production continues apace but with shortages still marked in some specifications, notably nails and wire fencing. Processing wire is not available in sufficient quantity to meet demands of the territory. A few relatively small plants projected to the district are understood to have abandoned their plans due to the continued wire shortage.

Tin Plate . . .

Tin Plate Prices, Page 147

Pittsburgh—Except for July 4th holiday tin plate output has been well sustained, in sharp contrast to finishing mill schedules for other steel products. Sellers report continued heavy pressure for nearly all type containers, although some easing is noted for crown closures and coffee containers. General line can needs, particularly oil and beer containers, continue very strong. Demand from this source is expected to offset the anticipated easing in requirements for perishable food pack program. Extremely heavy export demand and fact inventories of container companies are well below normal also are seen bolstering tin plate demand for months ahead. Lagging freight car construction is expected to have an adverse effect on tin plate shipments early this fall when the car shortage will be accentuated by the indicated heavy grain movement. Most producers expect tin plate coating regulations and export directives to be extended for another year.

American Can Co. Terminate Container Allocation Plan

New York—American Can Co., this city, ended its metal container allocation plan on July 1 as scheduled, but customers were warned that the prospect of supplying their needs fully for the remainder of the year and of having containers in 1948 for everyone who has had to resort to substitute packages depends on uninterrupted steel production.

The allocation plan was instituted six months ago to effect equitable distribution of the then inadequate receipts of tin mill products. On May 9 the company announced a decision to end the plan July 1 because customers in many lines had revised their estimates of 1947 container requirements and it appeared that these revised requirement estimates were coming into balance with expected receipts of steel sheets.

Barring labor disturbances, W. C. Stolk, vice president, said the company has been confident of being able to supply 100 per cent of most customers' demands in the coming six months and of being able to modify its allocation-period policy of declining to accept new business by contracting with new customers to supply their full can requirements after Dec. 31. Only with uninterrupted steel deliveries will this be possible he indicated.

Beer cans, he said, are the one item for which demand is so far out of pro-

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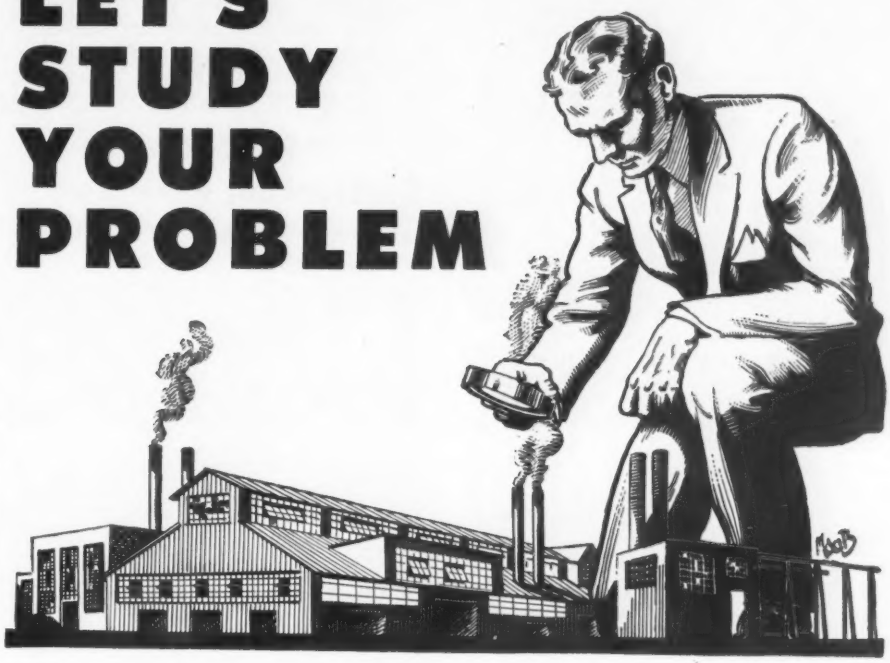

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portion that meeting 100 per cent of requirements would be impossible. Can manufacturers have been counting on receiving sufficient steel to make about 1 billion more steel containers this year than the estimated output in 1941 of 25 billion cans, which was the biggest volume in history, according to Mr. Stolk.

Tin would be no obstacle to this contemplated production, even though the United States was cut off for nearly four years from lands which before the war supplied 92 per cent of its requirements for this metal. Industrial research has made it possible to produce 26 billion cans with 40 per cent less tin than was consumed in 1941, Mr. Stolk said.

He pointed out that electrolytic tin plate, bonderized plate, low-tin content solders and other research developments will have saved some 80,000 tons of tin during the six years ended Dec. 31, 1947, in metal can production alone, the equivalent of more than two years' consumption before the war. In making electrolytic plate commercially practical during the war emergency, five to ten years of normal development work were telescoped into two, he said.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 146

Philadelphia—Experiments by the New Jersey State Highway Commission with a new type of highway reinforcing, a heavier mesh without use of expansion joints and involving new design, is of note. Concrete bar demand is generally in excess of supply and distributors are not willingly making forward commitments on larger tonnages. Pennsylvania highways and bridges account for about 300 tons in openings of July 29 with a larger tonnage involved in New Jersey projects. Of the eastern states, these two are going ahead with work involving more steel than the average.

Chicago—New inquiry for reinforcing steel has dipped farther and currently is of small proportions. Small jobs continue to be numerous, and it is the latter that attract most interest from suppliers. Limited in steel quotas by mills and being already over-committed to customers, suppliers are unable to accommodate large projects. The general situation, both as to availability of reinforcing steel and as to construction costs, is one that is discouraging considerable construction work at present.

Seattle — Rolling mill operations continue at full capacity, small tonnages predominating. Reinforcing bar bookings for the last quarter have been opened and backlogs are higher than normal. Several sizable projects are pending.

Structural Shapes . . .

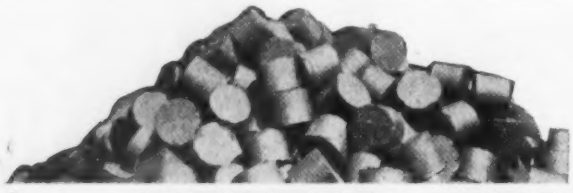
Structural Shape Prices, Page 147

Boston—New inquiry for fabricated structural steel is down, although a fair volume of tonnage is being estimated. Stabilization of construction costs is required for release of a considerable part of this volume, notably in the investment type of building. District fabricators have fair backlogs, three months and in a few instances more, but on the whole order books are lighter than those of the larger shops. There is also some easing in pressure for plain material or at least quotas appear to be more in line with current bookings; exceptions are warehouses and some industrial consumers of small or bar shapes. Interpretation of the three per cent sales tax in Connecticut would indicate this tax is retroactive as to shipments of fabricated structural steel as of July 1, although numerous contracts, as in the case of the Connecticut river bridge, Saybrook, Conn., were placed months ago.

New York—New inquiry for fabricated structural steel has slumped and the awarding of new contracts has been delayed in some instances; several thousand tons have been bid of late, but several are yet to be awarded. Engineering firms have a large volume of work on books for future estimates, notably for refineries and power plants. While some of this volume has been delayed, little has been canceled outright. Hardest hit by unstabilized prices for building materials is the investment type of building; those on which earning power is assured on completion are less affected.

Philadelphia—Although monthly allocations of structurals are held to recent levels, fabricators in most instances are not pressing as strong for tonnage. The reverse is true of warehouse distributors. Pending inquiry in this district is somewhat above the average for the East and considerable volume on which final action is pending has been big. Car shops are getting structural material in slightly better volume. A state bridge, Wilkes-Barre, closing July 29, takes 670 tons.

Chicago—Activity in fabricated structural steel continues to taper off, with both awards and new inquiry settling to lower levels. Fabricators show little concern over the situation, however, since they have orders on their books



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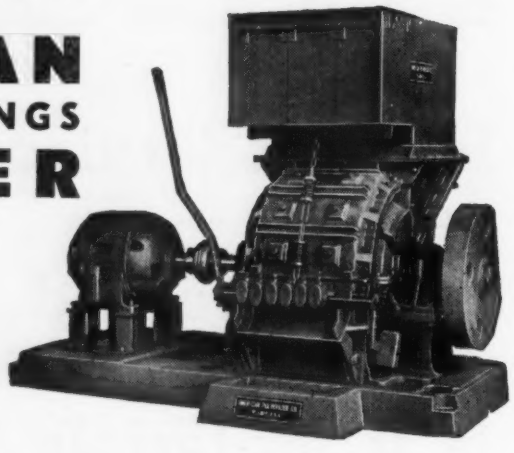

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sufficient to occupy their facilities beyond 1947. Because of slow deliveries of plain shapes from mills they are unable to make appreciable headway in increasing inventories. Scarcity of steel as well as the prevailing high construction costs are combining to cause delay or abandonment of major projects. Volume of small work, involving light tonnage, is reasonably good.

Birmingham—Shape demand is moderately strong but not on a level with plates, sheets and wire products in this district. Inquiries have been fairly numerous over the past few weeks, but most projects seem to be in the tentative stage only. High construction costs are holding many of the larger jobs in abeyance.

Seattle—Mill allocations of shapes are insufficient to supply the demand in this area. Many small contracts are being placed but shops hesitate to commit themselves on projects involving large tonnages.

Pig Iron . . .

Foundry grade expected to rise a minimum of $2 a ton as costs rise further

Pig Iron Prices, Page 148

Boston—Exemption of the Mystic furnace in the extension of the premium payment program for allocated housing tonnage will result in the continuation of broad distribution and goes far toward assuring foundries not engaged on housing products their current quotas of iron. Had the Everett furnace been included, considerable tonnage would have been diverted. While the cost of iron to New England users of Everett iron is up sharply, they are assured of some iron; otherwise some might have been forced to close as the ratio of iron in melts is already over high. Not for some time is Buffalo iron likely to come into this territory in normal volume and until the overall supply improves to a point not yet foreseen, the price factor will not loom too important.

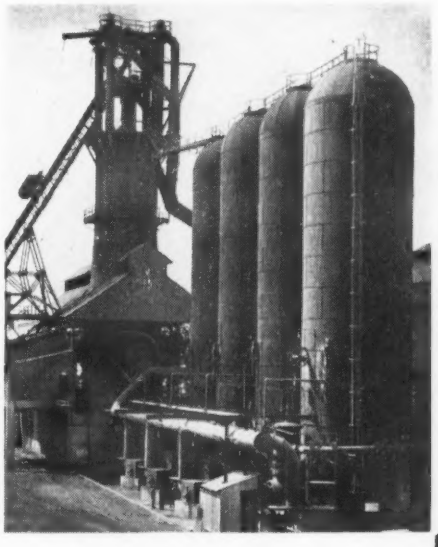
New York—Further increase in pig iron prices is seen in higher coke costs growing out of the new coal contract, a minimum of $2 being mentioned for foundry grades with a likelihood of more for basic. The latter is not affected by premiums for housing allocations. Pig iron tonnage lost by furnace suspensions recently has tightened the supply situation and consumer inventories are low. Melt this month will be below that for June because of vacation suspensions, but no ground was gained in view of production losses by blast furnaces.

Buffalo—Settlement of the coal strike resulted in an increase in blast furnace operations last week as Bethlehem's Lackawanna plant relighted its sixth stack. This furnace was relined in about five weeks which compares with earlier expectations that it would require at least two months to complete the job. Despite the holiday and vacation shutdowns there has been no shrinkage in merchant iron shipments during the week. Producers report further success in a voluntary allocation system to spread current output. Interest centers in the public auction on Tuesday, July 15, of the Otis Elevator Buffalo Foundry Division plant and equipment. Otis has discontinued foundry operations here. Machinery and equipment is valued at more than a million dollars.

Philadelphia—Melt this month will be off slightly, but there is no improvement in pig iron supply and none in immediate sight. Some uncertainty exists as to basing point for outside, notably southern iron in foundry grades. For the time being Swedeland, Pa., is used for this tonnage although Bethlehem, Pa., is now in the picture as the lowest base for the immediate Philadelphia area. Southern iron going to New England, while not in impressive volume, is being sold on a Buffalo base. Low phos is sold on a Steelton, Pa., basis. Some southern iron is coming in to cast pipe foundries, but heavy requirements in the area limits the volume available to northern consumers.

Pittsburgh—There is considerable pressure for higher pig iron prices, reflecting steadily rising production costs. Further pinch on pig iron profit margins is expected to develop out of recent UMW wage contract settlement. However, the lone merchant producer here denies contemplating any immediate price action. With resumption of beehive coke operations the extremely tight coke supply situation should gradually improve. Many foundries are shut down for two weeks' vacation period and operators hope to balance out inventories of pig iron, coke and cast scrap in the interim. Most foundries report little headway made against order backlogs in recent weeks, while demand is far in excess of ability to produce.

Chicago—Merchant pig iron supply in this district has been reduced by the recent suspension in coal mining and



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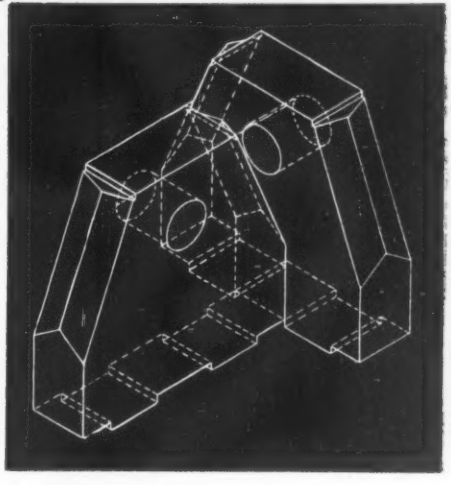

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under present peak demand conditions any fluctuation in supply has repercussions. Foundries are pressing for every ton of iron they can get and are making provision for unloading iron during periods when plants are closed for vacation. Loss in blast furnace output came about from reduced supply of coke. Two district blast furnaces remain banked, one for coal conservation and the other for relining. A third stack, heretofore making foundry iron, will be switched to basic for a 30-day period starting July 15. Thus, for some time ahead little improvement in foundry iron supply can be expected. Currently, foundry coke is almost as short as iron, output having been reduced during the coal mine shutdown. Effective July 2, foundry coke was advanced $1 per ton.

Cincinnati—Foundry melt is returning to earlier levels after a low point, because of vacation shutdowns, the first week in July. Shipments of pig iron have been slow, but the market is uncertain whether this is a lag frequently encountered, or a curtailment due to conditions at the furnaces. Oven foundry coke is higher and in tight supply which, so far, has not reflected the coal miners holiday.

Birmingham—Pig iron production remains at virtual capacity in the district and results in some momentary easing of the situation due to foundry vacations which are being more or less staggered in this section. The overall situation, however, is unchanged and with prospects that no real relief in iron is in sight this year. Pipe producers, for instance, are still considerably below capacity due to the recurring iron shortage.

Rails, Cars . . .

Track Material Prices, Page 147

New York—Production of domestic freight cars in June increased to the highest total since May, 1942, totaling 5514 units compared with 3929 in May, according to the American Railway Car Institute. The June total represents a gain of 40 per cent over May production and of 140 per cent over the 2293 cars built in February, the 1947 low. Of the June total, 4217 were constructed in shops of the railway car builders and 1297 in railroad shops.

S. M. Felton, president, said June's figures reflect a substantially improved flow of steel and other materials to car shops. "There remains some uneveness in distribution of components needed to produce complete cars, and strikes have also been a deterrent," he said, "but in both respects the situation is considerably better now than it was."

The backlog of domestic freight orders now on order and undelivered reached 107,476 as of July 1. Orders during June were: To car builders, 8585; to railroad shops, 3000; total, 11,585. New orders this year have been at a monthly rate of 10,460 compared with a monthly average of 5744 during 1946.

Scrap . . .

Scrap Prices, Page 152

Cleveland—Scrap prices advanced $2 to $4 a ton in this district last week. The market was established at $37.50 to $38 for No. 1 heavy melting steel, $30 to $30.50 for machine shop turnings, $40 to $40.50 for low phos, $46 to $48 for No. 1 cupola cast and $39 to $39.50 for No. 1 railroad heavy melting. The market was strengthened by the signing of the coal wage agreement, clearing the way for resumption of steelmaking at a high rate which, in turn, means heavy consumption of scrap. While the need for scrap has increased, production of scrap will be curtailed for several weeks while mass vacations are being taken in many metalworking plants. Purchase of scrap has also been stimulated by the prospect of paying higher prices for pig iron as a result of higher fuel prices. In the immediate district, undertone of the market was strengthened by active competition for supplies by outside districts.

Boston—Although open-hearth steel scrap prices have advanced slightly, the uptrend is more hesitant. Heavy melting steel is moving at $31.50 to $32, this price applying to bulk of busheling. Cast scrap is steady with prices for the most part showing slight change. Volume is holding up well, largely on outside demand with district consumers buying conservatively, although inventories in most cases are not substantial. Tonnage moving to yards is not heavy and demand for unprepared steel scrap is brisk.

New York—Price advances in heavy melting steel scrap are less sharp in this district. Most open-hearth grades are higher by 50 cents to $1.50, turnings showing the most rise. Heavy melting is quoted $32.50 to $32.85 with $1 more being paid at northern New Jersey points. Shipments are substantial. Cast grades are more active, generally at un-

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GEO. F. MARCHANT COMPANY
1420-34 So. ROCKWELL ST., CHICAGO 8, ILL.

changed prices. Pennsylvania railroad scrap list, closing July 16, includes 30,235 tons of which 9000 tons consist of No. 1 heavy melting.

Philadelphia—Open hearth grades of steel scrap have advanced again but less evenly, with heavy melting, bushelling and bundles going to $37-$38. One of the large consumers has been resisting this price for No. 2 bundles, paying no more than $36 and getting tonnage. Buying is fairly active as numerous consumers have low inventories and a high rate of operation is assured for some months. Other steelmaking grades followed advance in heavy melting with hardly an exception. Cast scrap is for the most part unchanged, although unstripped motor blocks are lower.

Pittsburgh — Prompt resumption of near capacity steel output is expected to stimulate scrap buying and will strengthen the market in the near future. Major stabilizing factor on present scrap market quotations is the fact that most steel producers are obtaining considerable tonnage direct from their customers on a reciprocity basis. Considerable tonnage, however, is needed in addition, and on the basis of favorable steel production outlook throughout the remainder of this year, it is believed the mills will soon have to re-enter the market for a substantial amount.

It is probable that mills will have to pay in excess of the present nominal price of $35.00 per ton for heavy melting steel when they again enter the market. Based on scrap prices in the East, heavy melting steel tonnage delivered here would exceed $40.00 per ton. Brokers state they would not accept a large tonnage order for heavy melting steel today for $35.00, adding that they could not cover at this price level. Some scrap tonnage undoubtedly is leaving this district on the basis of higher prices obtainable in other areas.

During the coal miner's vacation period, the leading producer claims to have been able to augment scrap inventories, having reduced steel ingot operations in direct proportion to the cutback in pig iron output. Other mills in this district continue out of the market, making present heavy melting steel quotations largely nominal.

Scrap collection efforts have not been stimulated to any extent despite recent upturn in prices. Supply of cast scrap items continues very tight, a condition accentuated by widespread vacation shutdowns at many metalworking plants. Dealer's stocks are well below normal and not much material is being collected by peddlers.

Buffalo—New scrap orders were expected momentarily at sharply higher prices. Dealers who have been forced to accept substantial losses to cover previous sales made within price ranges of $30 to $33 a ton for heavy melting and bundles were refusing to accept additional business at the prevailing range of $33 to $34. This range is now nominal pending fresh purchases. While bid and offering prices have been fluctuating erratically indications point to new orders being placed at $38 to $39 a ton, although there is some talk that $40 will be reached shortly. Dealers report yard receipts are none too good. Industrial scrap is also in lighter supply. This is probably due to holiday and vacation shutdowns in plants. Mills showed further buying interest as the miners strike ended and lifted the threat of a cut in ingot operations, at least temporarily.

Chicago—Price of scrap continues unchanged from that prevailing the preceding two weeks. Mills are more active in their buying now that the coal issue has been settled and steel production is given the green light for the balance of the year at least. Scrap supply has tightened, chiefly because a number of steel-consuming plants are closing for mass vacations. Lack of this scrap production will be felt for some time. Overmarket prices are heard in transactions between brokers and dealers as the former seek to obtain material to fill old contracts. It will be a few days before scrap begins to flow again from yards in the area recently hit by flood waters.

Cincinnati—Iron and steel scrap continued to rise last week, prices of all grades moving up $1. Strength in the market was attributed in part to the bidding done on recent railroad offerings. The higher prices brought out an expanded tonnage, and this was readily absorbed as melters sought to bolster stocks against the uncertain situation in raw materials. Buying by foundries shows an upturn after a sag due to vacations.

Birmingham—Scrap, even in the face of moderate buying, holds firm at recently announced increased levels. There is no indication of an early change. Some observers believe a major break is inevitable, however.

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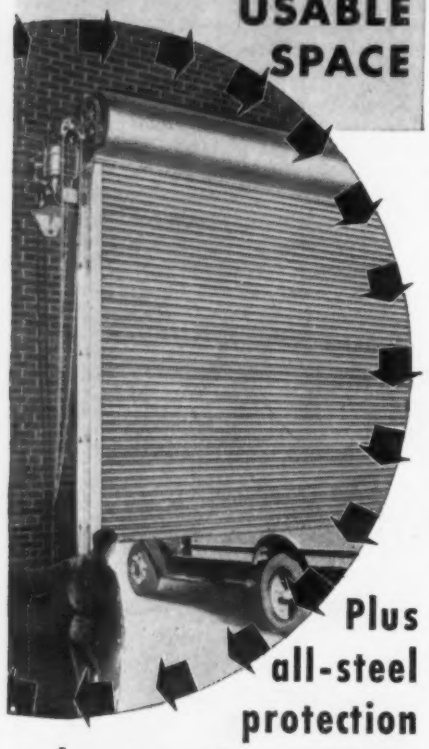

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Warehouse . . .

Warehouse Prices, Page 149

Pittsburgh—Revision in the combined size and quality warehouse extras for high carbon plates 1½-inch thick and under was established by a leading distributor recently, to reflect broader mill interpretation in charging the 50-cent killed steel quality extra for plates of 0.40 to 0.50 per cent carbon within this thickness range. The new extra schedules established by this interest are as follows: 1⅜ to 1½-inch, now $1.50 compared with 75 cents previously; 1¼ to ⅜-inch thick $1.10, against 50 cents; 5/16 to 1/4-inch $1.20, against 60 cents; and 3/16-inch $1.30, against 70 cents.

Distributors believe steel supply outlook should gradually improve over the remainder of this year, with possible exception of flat rolled products, and expect inventories to be in better balance by fourth quarter.

A break in the AFL-Teamsters truck strike was indicated by last weekend. Some metalworking companies have been forced to curtail operations because of this strike, although this has been partially offset by extensive vacation period shutdowns at many plants.

New York—Demand for steel from warehouses has slackened mildly, but is most pronounced in products on which distributors are best supplied, while alloys are definitely slow. On the other hand, structurals, bar shapes, plates, flat-rolled carbon and wire products are in active demand and stocks are not sufficient to meet inquiries. Galvanized sheets are especially short and merchant steel pipe is also on the critical supply list.

Philadelphia—With orders somewhat slower, warehouse inventories remain out of balance as regards flat-rolled, structurals, plates and small carbon bars and the decline in buying is less in these than for products on which distributors are better supplied. Part of the decline is due to vacation closings at consumers' plants and jobbers have made some progress in catching up with old orders because of lower ordering. Prospects for improved mill replacements for the tightest items are not bright.

Chicago—In face of heavy demand from steel consumers, warehouse distributors are losing ground inventory-wise. Prior to the miners' vacation of almost two weeks, some progress was being made in bolstering stocks of certain products, flat-rolled items excepted. That situation has been reversed, however, with steel mills in some districts having lost production because of suspension of coal mining. Chicago district mills suffered little output loss for this cause, but one wiremaker closed two weeks for vacation.

Price of carbon steel plates have been marked up 5 cents per 100 pounds, effective June 30. Plates are now being ordered on A.S.T.M. A-7 specification which entails a physical requirements extra of 5 cents per 100 pounds. Floor plates are unaffected by the price advance.

Cincinnati—Demand for steel from warehouses was accentuated by the recent uncertainties in production. Mill shipments have held up close to recent tonnages, in scarce items, but these were far short of district needs. There has been little or no improvement in the balance of stocks.

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Firth Sterling To Raise High-Speed Steel Prices

Pittsburgh—Due to the continued increase in price of tungsten ore from October, 1946, with the accompanying steady advance in ferrotungsten, Firth-Sterling Steel & Carbide Corp., McKeesport, Pa., will raise tungsten high speed steel base prices about 8 cents per pound, effective Aug. 1. It is pointed out that tungsten ore has advanced from $22 per net ton unit last October to $32 today for future purchases, and price of ferrotungsten increased from $1.88 to $2.25 per pound of contained tungsten during the same period. Some minor changes in the lower priced tool and die steels will be made effective the same date. Other producers are expected to take similar price action.

The new base prices in dollars per pound for tungsten high speed steels produced by Firth-Sterling Steel & Carbide Corp. are as follows:

18-4-1 high speed steel; approximately 18% tungsten and/or molybdenum, 4% chrome, vanadium 1.25 max.	$0.82
18-4-2 high speed steel; approximately 18% tungsten and/or molybdenum, 4% chrome, vanadium 1.30 minimum—2.30 maximum	0.93
18-4-1 plus 5% cobalt; approximately 18% tungsten and/or molybdenum, 4% chrome, 1% vanadium, 3 to 6% cobalt	1.29
18-4-2 plus 8% cobalt; approximately 18% tungsten and/or molybdenum, 4% chrome, 2% vanadium, 6 to 9% cobalt	1.53
14-4-2 high speed steel; approximately 14% tungsten and/or molybdenum, 4% chrome, approximately 1½% vanadium or over	0.80
14-4-2 plus 5% cobalt; approximately 14% tungsten and/or molybdenum, 4% chrome, approximately 2% vanadium, 3 to 5½% cobalt	1.29
16% tungsten hot work with nickel; 14 to 20% tungsten and/or molybdenum, 3 to 4½% chrome, 1½ to 5% nickel	0.88
18% tungsten, 4% chrome, 3% vanadium	1.04
12% tungsten hot work; 10 to 15% tungsten and/or molybdenum, 1.50 to 8% chrome, 0.20 to 0.80 vanadium	0.67
9% tungsten hot work; 6½ to 9½% tungsten and/or molybdenum, 1½% to 8% chrome, 0.20 to 0.80 vanadium	0.60
Carbon 0.90 to 1.20, chrome 5 to 7%, tungsten and/or molybdenum 3 to 5%, vanadium under 0.50	0.50
Fast finishing; carbon over 1%, tungsten and/or molybdenum 3 to 6½%, chrome 0.15 to 2%, with or without vanadium	0.55

Tool Steels . . .

Tool Steel Prices, Page 147

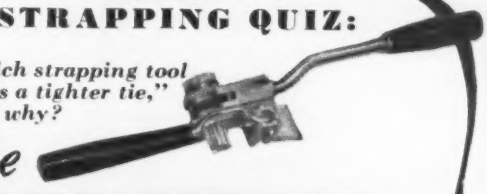
New York—Crucible Steel Co. of America is advancing prices, effective Aug. 1, on tungsten high-speed steels in line with the Firth-Sterling schedule. The increases are due to higher costs of tungsten ore and ferrotungsten, the former being up more than $10 a ton since last fall and the latter being up 37 cents a pound. Crucible's base price for 18-4-1 type will be 82 cents a pound compared with the previous price of 74 cents while the 12 per cent hot-work grade will advance to 70 cents from 67 cents. Minor changes in lower priced tool and die steels will be made at the same time.

Cleveland—Present tool steel prices will apply on orders placed up to Aug. 1, a prominent seller here reports, although plans have been made to increase prices on the high tungsten-bearing steels by about 8 cents a pound, effective Oct. 1. When new prices are announced it is expected many buyers will revert to use of the wartime steels of the 6-6-2 type, rather than continue to purchase 18-4-1 steels at the higher prices. Tool steels selling at 20 cents a pound and under are expected to go up about one cent a pound.

STRAPPING QUIZ:

Q. *Which strapping tool "ties a tighter tie," and why?*

A. *the* STEELBINDER

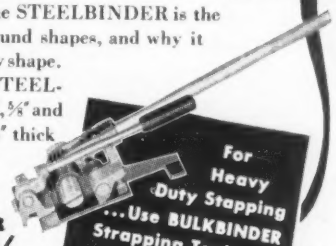


it places *no wedge* under the strap.

the OLD way . . .
Strapping tool places a wedge underneath the strap. When tool is disengaged, wedge comes out, and the strap is loosened.

the STEELBINDER way . . .
No wedge under strap at any point. When STEELBINDER is disengaged, strap is undisturbed, stays tight around the object.

• Working with no part under the strap, creating no slack when removed, the STEELBINDER ends the risk of overtightening to compensate for slack. The result is better control of the tying operation, and less strain on the strap. That's why the STEELBINDER is the only tool for binding round shapes, and why it "ties a tighter tie" on any shape. Remember, only the STEELBINDER handles ⅜", ½", ⅝" and ¾" wide strap up to .025" thick



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Iron Ore . . .

Iron Ore Prices, Page 148

Cleveland—Lake Superior iron ore shipments in June increased 32.39 per cent over June, 1946, totaling 11,457,455 tons compared with 8,654,437 a year ago, according to the Lake Superior Iron Ore Association, this city. Details of the movement by ports is as follows:

Port	June, 1947	June, 1946
Escanaba	570,164	508,191
Marquette	698,343	436,874
Ashland	833,458	718,661
Superior	3,971,717	2,852,957
Duluth	2,583,454	2,064,895
Two Harbors	2,543,190	1,972,394
Total U. S. Ports	11,200,326	8,553,972
Michipicoten	66,228	41,225
Port Arthur	190,901	59,240
Total Canada	257,129	100,465
Grand Total	11,457,455	8,654,437

Increase from year ago, 2,803,018 tons, or 32.39 per cent.

Cumulative shipments to July 1 this year totaled 26,278,719 tons compared with only 13,000,454 tons in the like 1946 period, an increase of 13,278,265 tons, or 102.14 per cent. Details of the movements are as follows:

Port	To July 1, 1947	To July 1, 1946
Escanaba	1,627,756	577,685
Marquette	1,478,039	463,728
Ashland	1,818,011	835,008
Superior	9,113,741	3,303,654
Duluth	6,075,279	4,002,121
Two Harbors	5,690,567	3,551,899
Total U. S. Ports	25,803,393	12,734,095
Michipicoten	155,291	166,940
Port Arthur	320,035	99,419
Total Canada	475,326	266,359
Grand Total	26,278,719	13,000,454

Metallurgical Coke . . .

Metallurgical Coke Prices, Page 148

Pittsburgh—Indicated advance of bituminous coal production costs of 85 cents per ton, as result of recent UMW wage contract, will result in a substantial advance of $1.50 to $2.00 per ton in coke prices, according to leading producers. This price action is expected soon.

Output of beehive coke in this district reached normal volume by the close of last week, reflecting steady increase in output of mines covered by the new contract. The Clairton coke works of Carnegie-Illinois Steel Corp. resumed capacity operations early last week.

Most foundries report coke inventory well below normal, although operations are not retarded because of this factor except from point of view of poor quality coke. Recent interruption of beehive and oven foundry coke output did not deplete inventories at many foundries to extent anticipated, for most interests in this district were shut down for a brief vacation period. However, coke supply remains major raw material bot-

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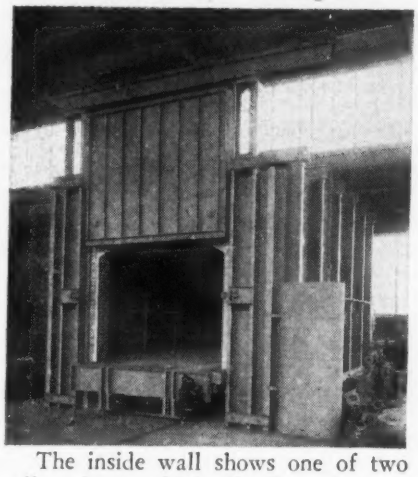
Picture shows an oil-fired forced convection type of car-hearth furnace built in 1942 for the American Steel Castings Company of Newark, New Jersey.

The heating chamber handles a charge of 22 tons per heat. Two circulating fans supply 25000 CFM each of air at 600° to 1300° F. for low temperature heat treatment of steel castings.



The inside wall shows one of two alloy ducts which distribute hot air horizontally across the charge from both sides. The return duct in the top of the chamber returns the air to the heater to be restored to temperature.

The vertical white lines on the duct are the connecting joints; the horizontal white lines the thermocouples. A burner safety control prevents operation of burners unless fans are running. Car drive and door-lift operate electrically.

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Who had won a first prize with a dahlia
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That's another that never will fail ya!"

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Typical ingenuities of R-S design are the counterweights, carried to the side rather than hung over the arch where the possibility of chain breakage would invite damage to brick-work. The guard prevents accidents to workers, but is high enough to discourage use as a waste-basket.

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R-S Products Corp.
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tleneck in preventing full scale foundry operations.

Cleveland—Disruption in coal mining operations had little or no effect on oven foundry coke output by the area's leading producer. Stocks of coking coal were sufficient at the beginning of the miners' vacation period to permit a high rate of operations to be continued. Within the last month this interest has lengthened the coking time, which has been reduced since mid-January, to improve the quality of his coke, at some sacrifice to quantity. Other sellers in the area—less fortunate in their coal inventories during the past two weeks—temporarily lengthened their coking time to stretch their coal stocks over a longer period. Price by the principal independent producer here is steady at $15.90, delivered, despite increases ranging from 96 cents a ton to $1.11 which have been announced by sellers servicing a few accounts in the area. Higher coal prices, seen resulting from the miners' settlement, are expected to result in higher direct coke costs of about $1.20 a ton.

Chicago—A leading producer of oven foundry coke here advanced its prices $1 per ton, effective July 2. The new prices per net ton are $17.10 for Chicago delivered, $16.10 for Chicago outside delivered, and $16.85 for Milwaukee ovens. No increases have so far been announced for Indianapolis ovens. Concurrently with advance in price, customers are no longer being billed for the federal transportation tax as has been universal practice. Net price increase to consumers, therefore, is 96 cents a ton. During the coal miners' vacation, some coke ovens were obliged to reduce production, in some cases as much as 15 per cent, but with mines returning to activity, hope is that full oven output can be restored shortly.

Cincinnati—Price of oven foundry coke has been advanced by $1.11 to a quotation of $16.46. By custom, the billings include the 4-cent tax, so that the quotation for practical purposes is now $16.50. The leading district producer commented on higher normal costs, and extraordinary expenses in acquiring coal supplies for fortification against mine shutdowns.

Canada . . .

Toronto, Ont.—There has been no curtailment in demand for steel and most steelmakers have only limited unfilled capacity to the end of September. It appears to be definitely settled that Wartime Prices and Trade Board plans no immediate change in its policy with regard to steel prices and these materials are to remain under present ceiling for a time longer. While the maintaining of ceiling prices on iron and steel has had no apparent effect on production schedule ceiling prices on scrap iron and steel are said to be largely responsible for the serious shortages of these materials in Canada. No effort is being made to collect scrap from the farm or other outlying communities owing to low prices and high costs which leave no margin of profit.

Steelmakers report heavy bookings for third quarter and it is apparent little progress will be made over the next three months in equalizing suppy and demand. On most lines of steel, domestic production is running only about 50 per cent of actual requirements. While imports from the United States have been in-

PORTRAIT OF A

who reports a decided increase in total output because he uses SCREW MACHINE PRODUCTS made FASTER and BETTER for LESS by

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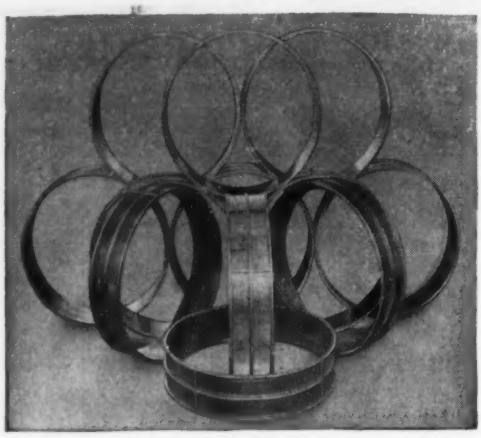

These milled-slot screens, for centrifugal drying of various materials, are made of 1/8″ stainless steel, and in their fabrication tolerances as close as plus or minus .0001″ were maintained; an illustration of Hendrick's expert workmanship.

Hendrick offers unusual facilities for the manufacturing of many specialized products, of which these screens are a typical example.

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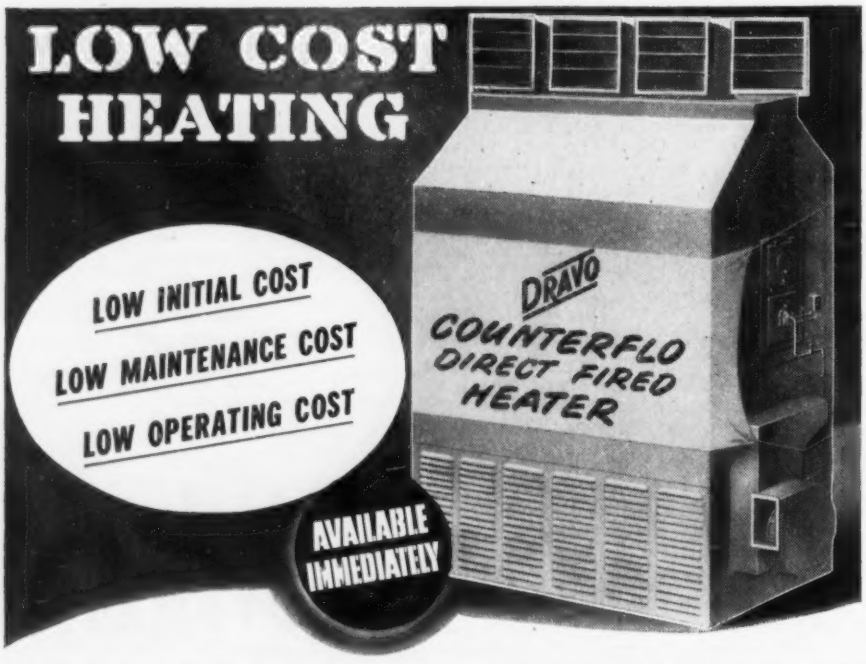

Add together the savings in initial equipment cost, operating expense and maintenance charges obtainable with Dravo Heaters and you have gone a long way in helping to offset the unusually high cost of building today. ★ ★ And Dravo Counterflo Heaters have other money saving advantages too; the interchangeability of gas burners with oil burners: the combination gas-oil burning arrangement available at purchaser's option; the large capacities ranging upward from 400,000 Btu output; control and fan systems arranged for summer ventilating service; stainless steel chamber for extra long life. ★ ★ Since Dravo Heaters are *available immediately* in stock, you can use the summer ventilating feature now and be prepared for comfort heating next season. Write for Bulletin FL-516 for full description.

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creased, total available supply is somewhat less than 75 per cent of all consumer needs.

On steel sheets, black and galvanized, books have been closed by most makers for third quarter due to the fact that production schedules for the next three months are filled and with no surplus capacity available sheetmakers have withdrawn from the market. Demand for sheets exceeds supply by about 50 per cent despite the fact that output is being maintained at capacity of available steel supply.

With a number of bar makers endeavoring to hold commitments to two months into the future, solid bookings through July and August are reported, with chief demand centered on the lighter sizes.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1625 tons, state highway bridge, Connecticut river, Greenfield-Montague, Mass., to Phoenix Bridge Co., Phoenixville, Pa., through J. F. Fitzgerald Construction Co., Boston, general contractor.

1000 tons, acidulating buildings, Swift & Co., Cleveland, O., and Madison, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

850 tons, maintenance building, Carborundum Co., Niagara Falls, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., New York, general contractor.

750 tons, state highway bridge, Gloucester county, New Jersey, to Bethlehem Steel Co., Bethlehem, Pa., through F. A. Canuso Co., general contractor.

750 tons, bridge, Ft. Bragg, Calif., for State Highway Department, to Consolidated Steel Corp. Ltd., Los Angeles.

700 tons, beam span, Temple, Tex., for State Highway Department, to Virginia Bridge Co., Roanoke, Va.

500 tons, addition, turbine testing laboratory, navy yard, Philadelphia, to Lehigh Structural Steel Co., Allentown, Pa.

500 tons, bottling plant, Ortlieb Brewing Co., Philadelphia, to Belmont Iron Works, Philadelphia.

300 tons, press room flooring, Philadelphia Inquirer, to American Bridge Co., Pittsburgh.

150 tons, bridge, Chesterfield, Mass., to Bethlehem Steel Co., Bethlehem, Pa.

148 tons, bridge repairs, Chicago, Milwaukee, St. Paul & Pacific Railroad, Tama, Iowa; 121 tons to American Bridge Co., Pittsburgh, and 27 tons to Joseph T. Ryerson & Son Inc., Chicago.

STRUCTURAL STEEL PENDING

2500 tons, addition to power plant, Consolidated Gas, Electric & Power Co., Baltimore.

1500 tons, addition to hospital, University of Illinois, Chicago; project abandoned, appropriation withheld.

1500 tons, building, Evinrude Motors Division, Outboard Marine Mfg. Co., Milwaukee; bids April 30; project abandoned.

670 tons, reconstruction and repair, state bridge, Wilkes-Barre, Pa.; bids July 25, department of highways, Harrisburg, Pa.; also 16,700 square feet, steel beam bridge flooring.

250 tons, bridge, route 4 parkway, section 5, Woodbridge-Clark Township, N. J.; bids July 29, state highway commission, Trenton, N. J.

230 tons, addition to armory, Minnesota National Guard, St. Paul.

205 tons, two bridges, Newark, N. J.; bids July 29, state highway commission, Trenton, N. J.

200 tons, bridge repairs, Pennsylvania railroad, Perryville, Md.

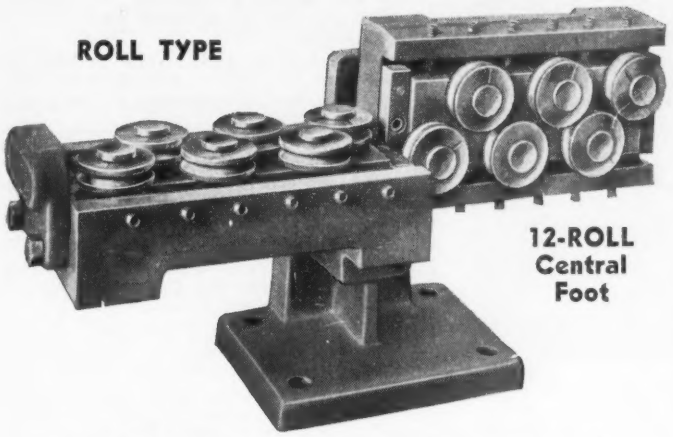
150 tons, steel sheet piling, U. S. Engineer, Duluth, Minn.; bids in.

125 tons, U. S. engineer, Tulsa, Okla.; bids July 14, inv. 102.

Unstated, $50,000 telephone exchange build-

Two Wire Straighteners
WITHOUT CUTTERS

ROLL TYPE



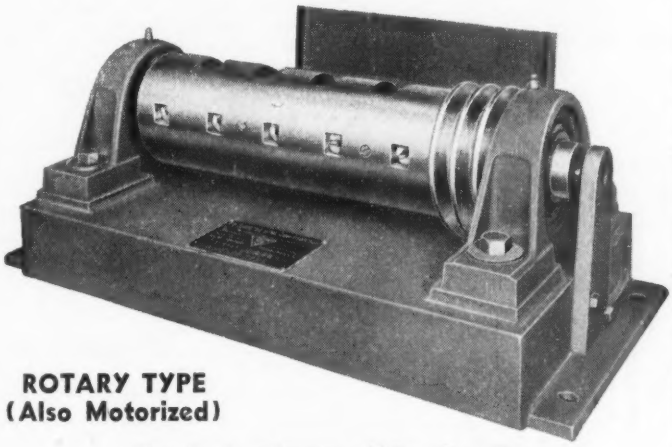
12-ROLL Central Foot

The Roll Type shown above is generally used with automatic machines. The wire is drawn through the straightener to remove the natural curve and put it into better shape for the forming dies. Made in sizes from 1/16" to ½".

The Rotary machine shown below has no feeding attachment. The wire is pulled through mechanically while the head revolves at high speed. Made in sizes from 1/16" to ⅜".

In the case of either of these machines, the size indicates the maximum diameter of wire that can be handled, but several smaller sizes can also be worked.

Glad to send further information. It will help us in recommending a suitable die material if, when writing us, you give the diameters and kinds of wire you wish to straighten.

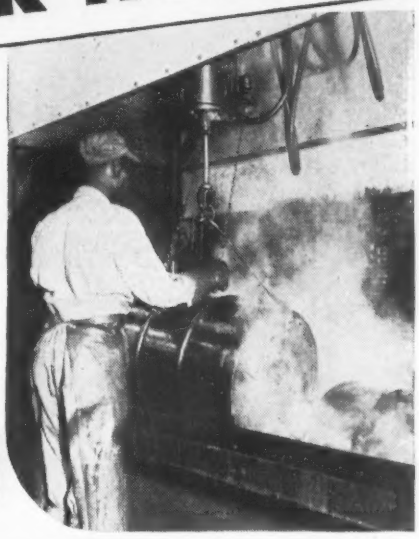


ROTARY TYPE
(Also Motorized)

The F. B. Shuster Mfg. Co., Inc.
3106 Mill River St., New Haven, Conn.

SHUSTER
Automatic
WIRE STRAIGHTENING
AND CUTTING
MACHINES
Since 1866

A CURTIS AIR HOIST



Stepped Up Production 50%, Eliminated Workman Fatigue—Proved, Fast, Safe, Dependable

A prominent cooperage company states the above facts about their use of a Curtis Air Hoist used in washing reclaimed metal barrels in a steam and caustic soda bath.

Here's additional proof of the labor saving advantages of Curtis Air Powered Equipment. In plant after plant, Curtis Air Hoists are cutting labor costs, saving money and speeding production routine. They offer:

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- Smooth, fast, accurate control
- Finger-tip operation
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- Capacities to 10 tons

Write for Form C-7 for full information on Curtis Air Hoists, Air Cylinders and Air Compressors.

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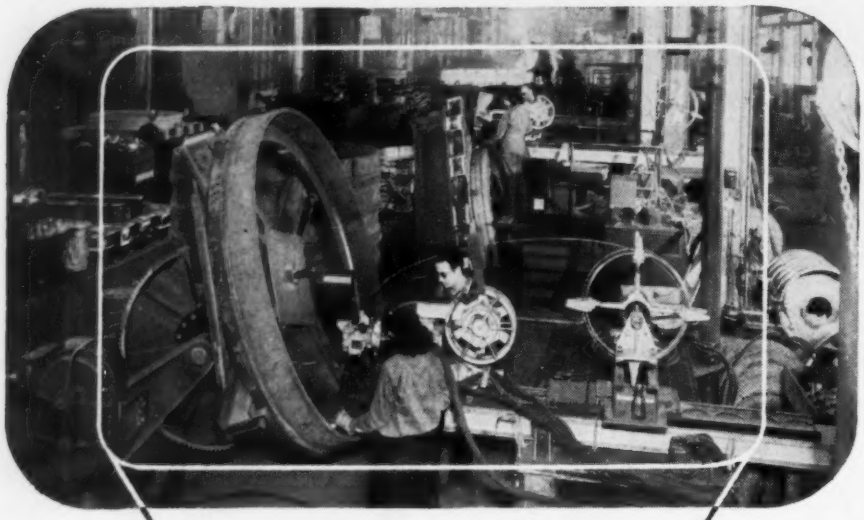
Firm .....
Street .....
City ..... *Zone* ..... *State* .....

93 Years of Precision Manufacturing



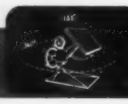
Setting new standards in production welding

Matching their important contribution to faster production welding for war, C-F Welding positioners are setting new standards in post-war welding practice. Shops already equipped with C-F Positioners are pacing the field in the race for new markets.

Equipped with variable speed control in any practical speed ratio, from 0 RPM and up, for handling circular or peripheral welds, C-F Positioners are speeding production welding practices everywhere. Speed selection is fast, easily made, permitting quick changeover of material being welded.

C-F Positioners as production tools are changing welding practice from slow, costly operations to faster, better automatic downhand welding. Cost of welding footage is reduced, "overwelding" is eliminated and machine or operator capacity is materially increased. There are hand or power operated C-F Welding Positioners in capacities from 1200 to 30,000 lbs. Write for illustrated bulletin WP 22. Cullen-Friestedt Company, 1308 South Kilbourn Avenue, Chicago 23, Illinois.

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL.



C-F positioned welds mean better, more economical welds

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We offer you the advantages of more than 25 years of specialized experience in designing and manufacturing Special Washers. During these years we have accumulated over 10,000 sets of tools, one of which may exactly fit your specifications.

SMALL STAMPINGS

As in the case of Special Washers, we can supply Small Stampings in any metal, in any quantity. Hundreds of satisfied customers are testimony to our high quality and reasonable prices. Send us your specifications or prints.

THE MASTER PRODUCTS CO.
6400 PARK AVENUE • CLEVELAND 5, OHIO

ing addition, Bellingham, Wash.; Charles N. Standen, awarded general contract.

REINFORCING BARS . . .

REINFORCING BARS PLACED

200 tons, accelerator building, University of Chicago, Chicago, to Ceco Steel Products Corp., Cicero, Ill.

112 tons, highway bridges, New Milford, Ill., for state, to Joseph T. Ryerson & Son Inc., Chicago; States Improvement Co. Inc., Chicago, contractor.

100 tons, women's dormitory, Northern Illinois State Teachers College, DeKalb, Ill., to Ceco Steel Products Corp., Cicero, Ill.; Federal Constructors Inc., Chicago, contractor.

REINFORCING BARS PENDING

450 tons, building, Evinrude Motors Division, Outboard Marine Mfg. Co., Milwaukee; bids May 13; project abandoned.

300 tons, bridge, route 4 parkway, section 5, Woodbridge-Clark Township, N. J., bids July 29, state highway commission, Trenton, N. J.

150 tons, mesh and bars, state highway projects, Pennsylvania; bids July 25, department of highways, Harrisburg, Pa.

145 tons, reconstruction and repair, state bridge, Wilkes-Barre, Pa.; bids July 25, department of highways, Harrisburg, Pa.

115 tons, two bridges, route 25, section 34B, Newark, N. J.; bids July 29, state highway commission, Trenton, N. J.

105 tons, power house, Lake Superior Power Co., Ashland, Wis.; Lacrosse Dredging Corp., Chicago, contractor; bids June 5.

Unstated, Bureau of Roads, Jackson Creek bridge, Umpqua national forest, Oregon; Tom Lillebo, Reedsport, Ore., low, $108,275.

Unstated, four concrete state bridges, Adams county, Wash., general contract to David Nygren, Seattle, $59,978.

Unstated, naval armory, Bellingham, Wash.; Paul N. Odegard, Everett, low, $194,850.

PLATES . . .

PLATES PLACED

1800 tons, tanks, Socony-Vacuum Oil Co., Paulsboro, N. J., to Graver Tank & Mfg. Co.

PLATES PENDING

Unstated, elevated steel water tank for McNary dam, Oregon; American Pipe & Construction Co., Portland, low $44,999, to U. S. engineer, Portland.

PIPE . . .

CAST IRON PIPE PENDING

2000 tons, plus, various sizes for inventory, Seattle, to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J., subject to council inquiry.

1000 tons, various sizes for inventory, Seattle, to Crane Co., Seattle, for American Cast Iron Pipe Co.; subject to city council inquiry.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Union Pacific, two 6000-horsepower diesel locomotives, to Fairbanks, Morse & Co., Chicago, to be delivered in February, 1948; cost $1,250,000. Railroad now has orders placed for 143 diesel power units.

RAILROAD CARS PLACED

Chicago & Eastern Illinois, 25 fifty-ton steel flat cars, to American Car & Foundry Co., New York.

Great Northern, 500 fifty-ton box cars, to own shops at St. Cloud, Minn.

Gulf Mobile & Ohio, 300 fifty-ton welded box cars and 100 fifty-ton steel high side gondola cars, to American Car & Foundry Co., New York.

Illinois Central, 1500 fifty-ton hoppers and 1500 fifty-ton box cars, to own shops.

RAILROAD CARS PENDING

Union Pacific, 1600 box cars; bids asked.

UNIT 357 Mobile Crane

- *It's Self-Propelled*
- *It Rides on Rubber*
- *It Has 1001 Uses!*

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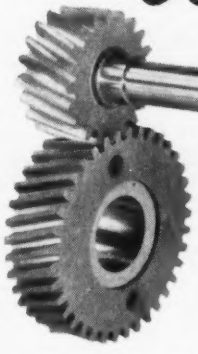

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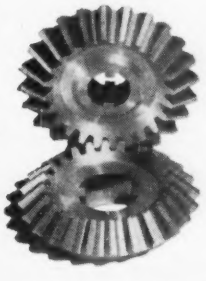
SPIRAL BEVEL GEARS—Made from 1" to 30" in diam. and 24 DP to 1½ DP.
WORM GEARS—Made from 1" to 100" in diam. and from 24 DP to 1 DP.



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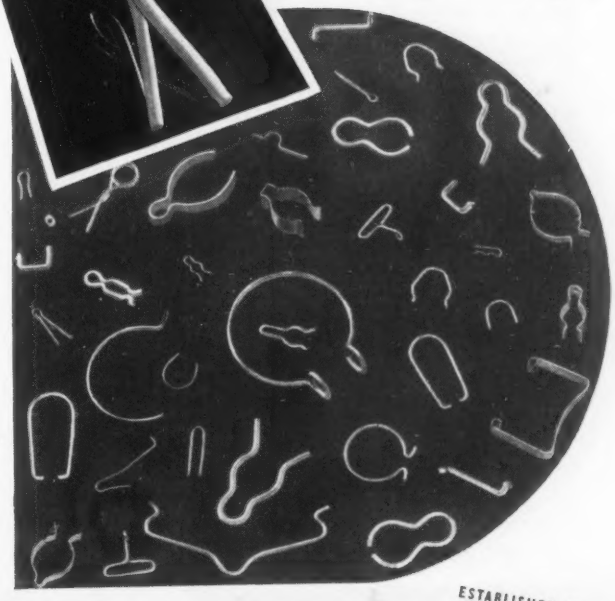

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READING HOISTS

CONSTRUCTION AND ENTERPRISE

CALIFORNIA

EL MONTE, CALIF.—A-1 Metal Products Co., 601 E. Stewart Ave., has been formed by Robert LeRoy.

LOS ANGELES—Sierra Drawn Steel Corp., 5821 Randolph St., has completed a building with a floor area of 8800 sq ft, first unit of an expansion program.

LOS ANGELES—Ceejay Products Co., 2304 E. 48th St., has been formed by C. A. Munz and J. L. Milliorn to manufacture car transmission equipment and clutches.

LOS ANGELES—Delron Co. Inc., 3003 San Fernando Rd., has been formed by Deleray Mouron to manufacture bolts, nuts and studs.

LOS ANGELES—Pacific Metal Industries, 582 San Fernando Rd., has been formed by William Sadar and Cecil A. Yates.

LOS ANGELES—Draves & Patterson Metal Products Co., 140 N. Los Angeles St., has been formed by Charles H. Draves and Robert B. Patterson.

LOS ANGELES—General Iron Works, 3973 E. Third St., has been formed by R. W. Stone.

LOS ANGELES—Modern Steel Tile Co., 2214 W. Jefferson Blvd., has been formed by John T. Freehill and Joseph Cunix.

RIVERSIDE, CALIF.—Riverside Iron Works, 5422 Mission Blvd., has been formed by Stanley G. Billingsley.

SAN JOSE, CALIF.—General Electric Co., 5441 E. 14th St., Oakland, is preparing plans for construction of a $1,700,000 plant for manufacture of electric motors on Monterey Rd. here. Structural engineer is Leland S. Rossner, 233 Sansome St., San Francisco.

ILLINOIS

CHICAGO—Advance Iron & Metal Salvage Co., 1144 S. Fairfield Ave., recently suffered a fire in its 2-story building.

CHICAGO—W. F. McLaughlin & Co., 610 N. LaSalle St., will build a $500,000, 2-story factory. Engineer and architect is H. K. Ferguson Co., Hanna Bldg., Cleveland.

IOWA

DES MOINES, IOWA—Des Moines Chamber of Commerce and Greater Des Moines Committee, 407 37th St., have plans under way for a $600,000 furnace factory. Lessee will be Armstrong Furnace Co., Columbus, O.

KANSAS

RIVERTON, KANS.—Empire District Electric Co., Joplin, Mo., plans to spend $4 million on a steam power generating plant and power equipment.

MICHIGAN

REDFORD TWP., MICH.—Standard Tube Co., Detroit, is building a $875,000 plant here. Contract has been awarded to Cunningham-Rudy Co., 3087 W. Grand Blvd., Detroit. Consulting engineers are Albert Kahn Associated Architects & Engineers.

MISSOURI

ST. LOUIS—Devlin Corp., c/o D. Bartlett, attorney, 506 Olive St., plans to build a $500,000 plant on a city block bounded by John and E. Grand Aves. and Powder and Whitman Sts.

ST. LOUIS—Missouri Portland Cement Co., 3615 Olive St., plans to spend over $1 million on cement plant additions in St. Louis county. Architect and engineer is MacDonald Engineering Co., 188 W. Randolph St., Chicago.

NEW YORK

BUFFALO—Colonial Radio Corp. plans extensive alterations at its Rano St. plant.

BUFFALO—National Aniline & Chemical Co., S. Park Ave., plans a $20 to $30 million project to include warehouses, a shop, powerhouse and power equipment.

COURTLAND, N. Y.—Overhead Door Co. will build a $225,000 1-story factory. Plans are by Leo F. Caproni, 1221 Chapel St., New Haven, Conn.

NIAGARA FALLS, N. Y.—Electro Metallurgical Co. plans to build a 3-story factory costing $185,000.

OLEAN, N. Y.—Clark Bros. Co. Inc. will begin construction of an assembly plant this month.

NORTH CAROLINA

PINEVILLE, N. C.—Proximity Mfg. Co. will build a $100,000 plant.

OHIO

AKRON—Colonial Salt Co., Manchester Rd., has almost completed the first quarter of a $1 million expansion and modernization program.

BEREA, O.—Ohio Nut & Bolt Co., 600 Front St., R. J. Whelan, president, plans a $50,000 office and factory addition.

CLEVELAND—Tinnerman Products Inc., 2038 Fulton Rd., has purchased a 32-acre tract of land for construction of a plant and warehouse on Brookpark Rd.

CLEVELAND—J. H. Holan Corp., newly formed to fabricate truck bodies, will soon start construction on a $115,000, 1-story plant on W. 150th St.

GALION, O.—Perfection Steel Body Co. will soon start a $100,000 factory addition.

GALION, O.—Central Ohio Steel Products, 605 S. Market St., Gilbert Stiebel, president, is constructing a $65,000 factory addition.

ORRVILLE, O.—Crown Steel Products Co., R.D. No. 2, has been incorporated with a capital of $70,000 by Julius Fejes and associates.

OKLAHOMA

TULSA, OKLA. — Mid-Continent Petroleum Corp., Mid-Continent Bldg., has awarded a $3,400,000 contract to M. W. Kellogg Co., Philtower Bldg., for a refinery expansion program.

PENNSYLVANIA

AMBRIDGE, PA.—A. M. Byers & Co. Inc. will build a $500,000 plant extension.

TEXAS

HOUSTON, TEX.—Technical Instrument Co., 3700 Block Westheimer Rd., will build a $100,000 plant. Plans are by MacKie & Kanrath, 2713 Ferndie St.

TEXAS CITY, TEX.—Monsanto Chemical Co., J. R. Mares, general manager, has let a $1 million contract to W. S. Bellows Construction Co., P.O. Box 2127, Houston, for a main office building and warehouse. Monsanto has also let a $5 million contract to Leonard Construction Co., Chicago, for mechanical installations and processing equipment.

UVALDE, TEX.—Uvalde Rock Asphalt Co. plans to build a $215,000 rock crushing plant and make milling plant improvements.

WASHINGTON

SEATTLE—Monsanto Chemical Co., 1700 S. Second St., St. Louis, has awarded a $715,000 contract to Howard S. Wright & Co., 407 Yale Ave. N., for construction of a factory and warehouse.

WISCONSIN

MILWAUKEE—National Enameling & Stamping Co., 270 N. 12th St., has awarded a $132,000 contract to Selzer, Ornst Co., 6222 W. State St., Wauwatosa, for construction of a 1-story factory addition. Architect is Fitzhugh Scott, 724 E. Mason St.

"Industrial"

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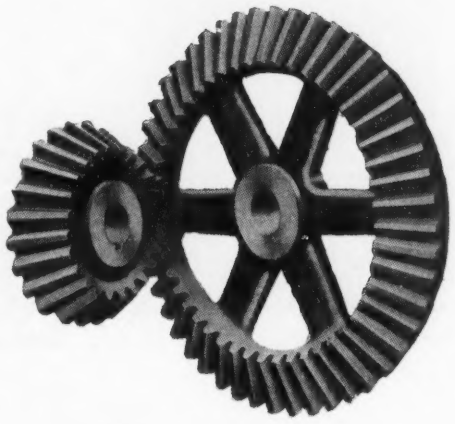
ROLLER AND SILENT CHAIN SPROCKETS



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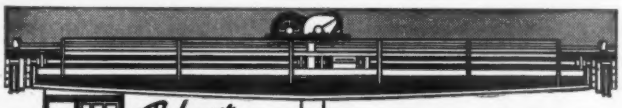

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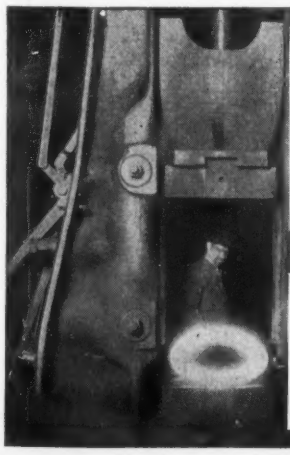

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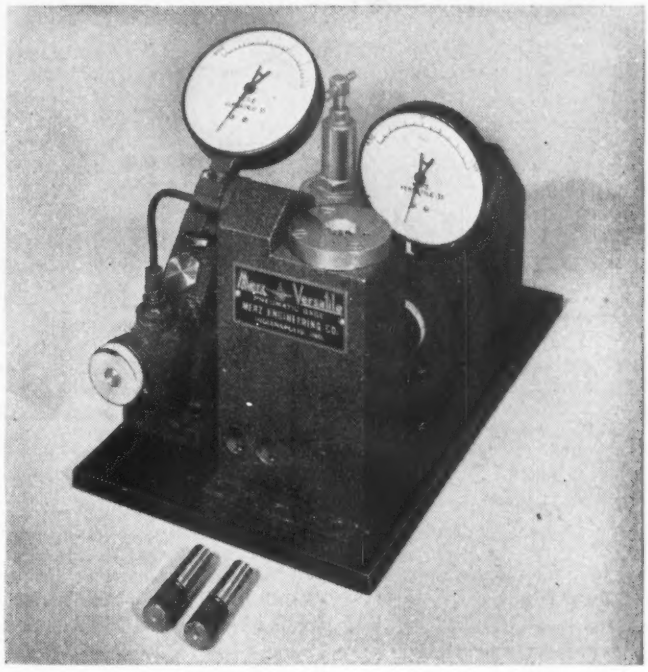

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Manufacturers of Cold-Headed Specialties—Established 1850

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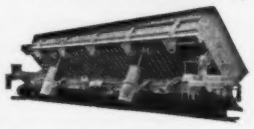

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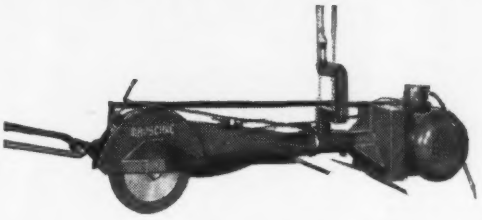

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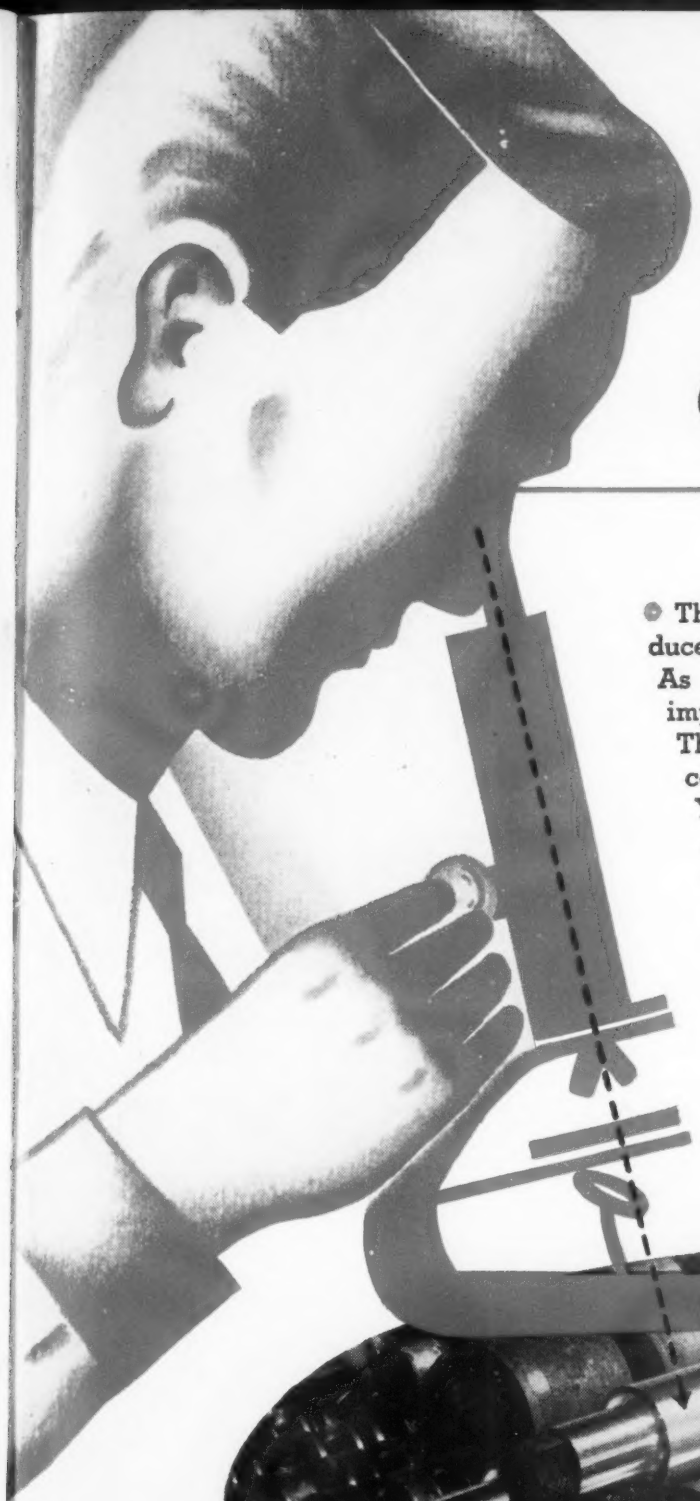

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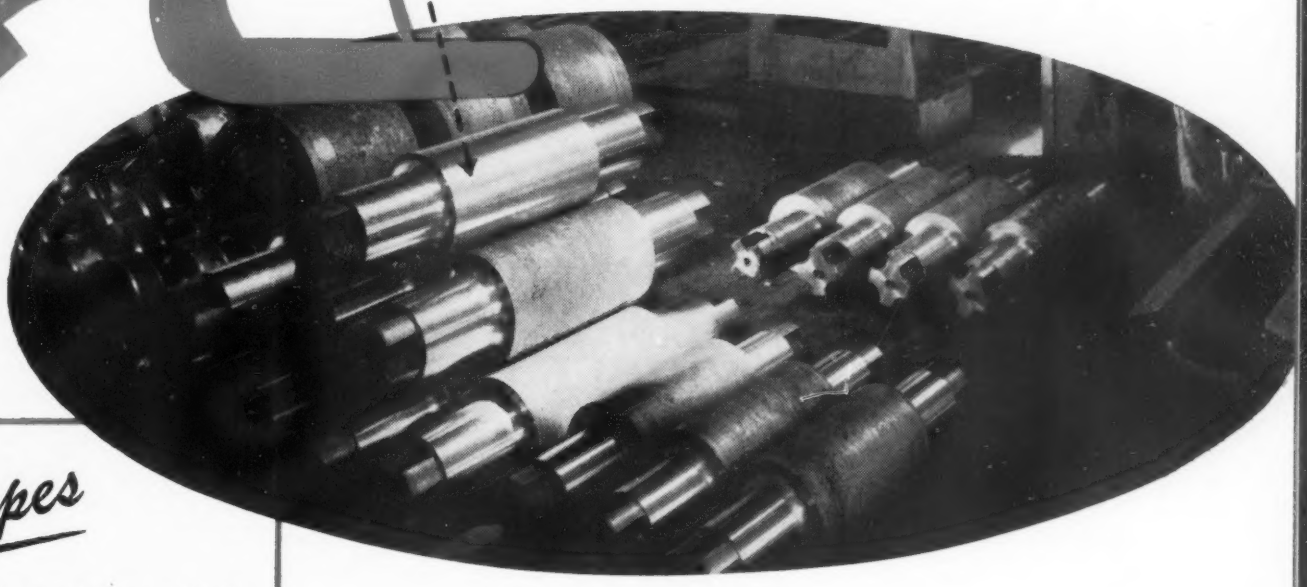

Types

Sizes — from rolls for an 8-inch mill, all intermediate sizes up to large plate mill rolls, 34" x 206".

Plain Chill	Alanite A-B-C-D
Sand Iron	
Moly Chill	Asex Grain
Nickel Chill	Asex Special

THE AETNA-STANDARD ENGINEERING COMPANY

YOUNGSTOWN, OHIO

ASSOCIATED COMPANY: HEAD, WRIGHTSON & CO., LTD., MIDDLESBROUGH, ENGLAND

This red hot rotor turns at 30,000 r.p.m.!

Where can you use a steel like this?

PICTURE the forces tearing at this turbine wheel as it spins at 30,000 r.p.m. What *steel* under the sun could withstand such punishment while heated red-hot by the blast of gases as hot as 1700°F.? Only *one* commercial alloy could do it . . . the sensational new "16-25-6", developed during the war by metallurgists of The Timken Roller Bearing Company!

Used for turbine wheels in the turbo-supercharger and in jet propulsion engines, "16-25-6" has opened whole new horizons to the aviation industry. Where can *you* use a steel like this? Added to its incredible strength at destructive temperatures, "16-25-6" has excellent weldability, good machinability and forgeability and high resistance to scale and corrosion.

As leaders in production of alloy steels—with specialized experience in high-temperature problems—The Timken Roller Bearing Company had the background which made the development of "16-25-6" possible. This same background is available to you—to aid you in adapting "16-25-6" to your purposes, or to help you pick other alloy steels suited to your needs. Write Steel and Tube Division, The Timken Roller Bearing Company, Canton 6, Ohio.

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing.